FEBRUARY 1956
VOL. LI No. 2

41.8
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VETERINARY Medicine

Established 1905

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features in this issue...

Physical Properties of Paunch Juice which May Contribute to Bloating

Use of Hydrocortisone Intravenously

Intrathoracic and Intratracheal Treatment of Infectious Bovine Rhinotracheitis

Advances Made in Swine Practice, Part IV

Historical Background of Current Problems in Animal Disease

Treatment of Neurological Conditions in Dogs and Cats

Intravenous Tetracycline in Small Animal Practice

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ENTERED AS SECOND CLASS MATTER SEPTEMBER 10, 1949, AT THE POST OFFICE AT KANSAS CITY, MO. UNDER THE ACT OF MARCH 3, 1879

Published Monthly
$5.00 PER YEAR
50c PER COPY

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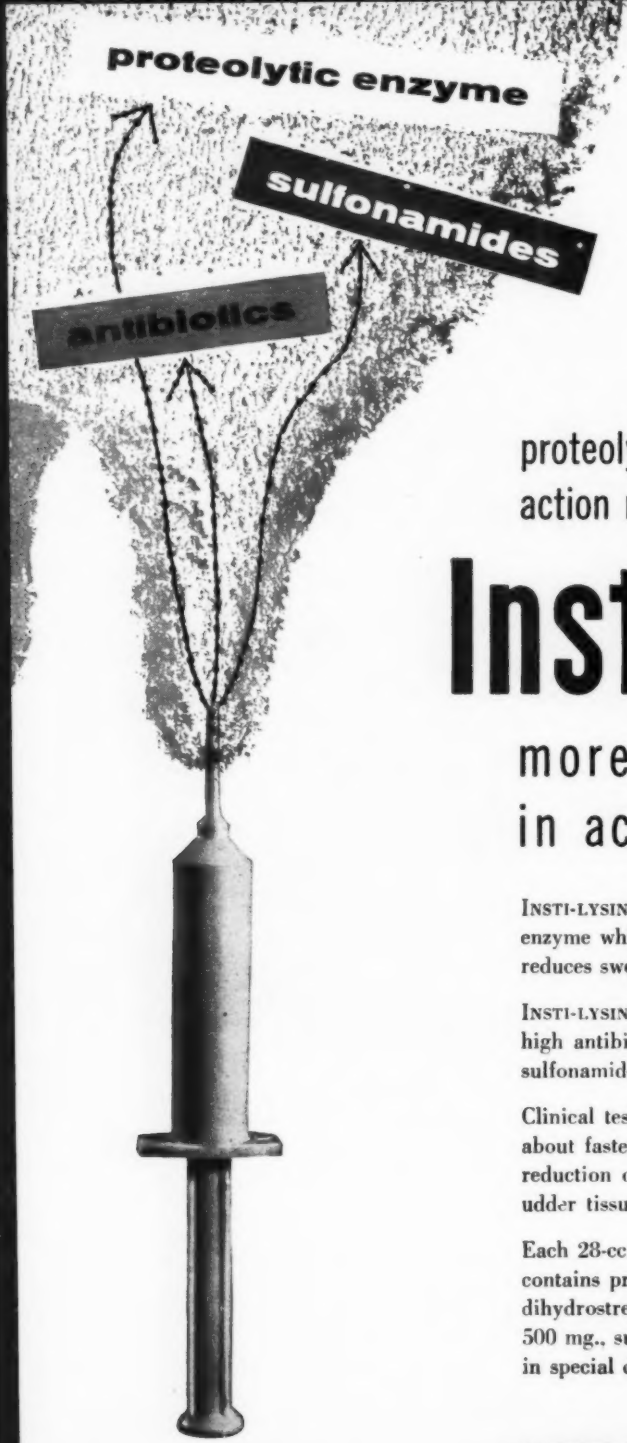

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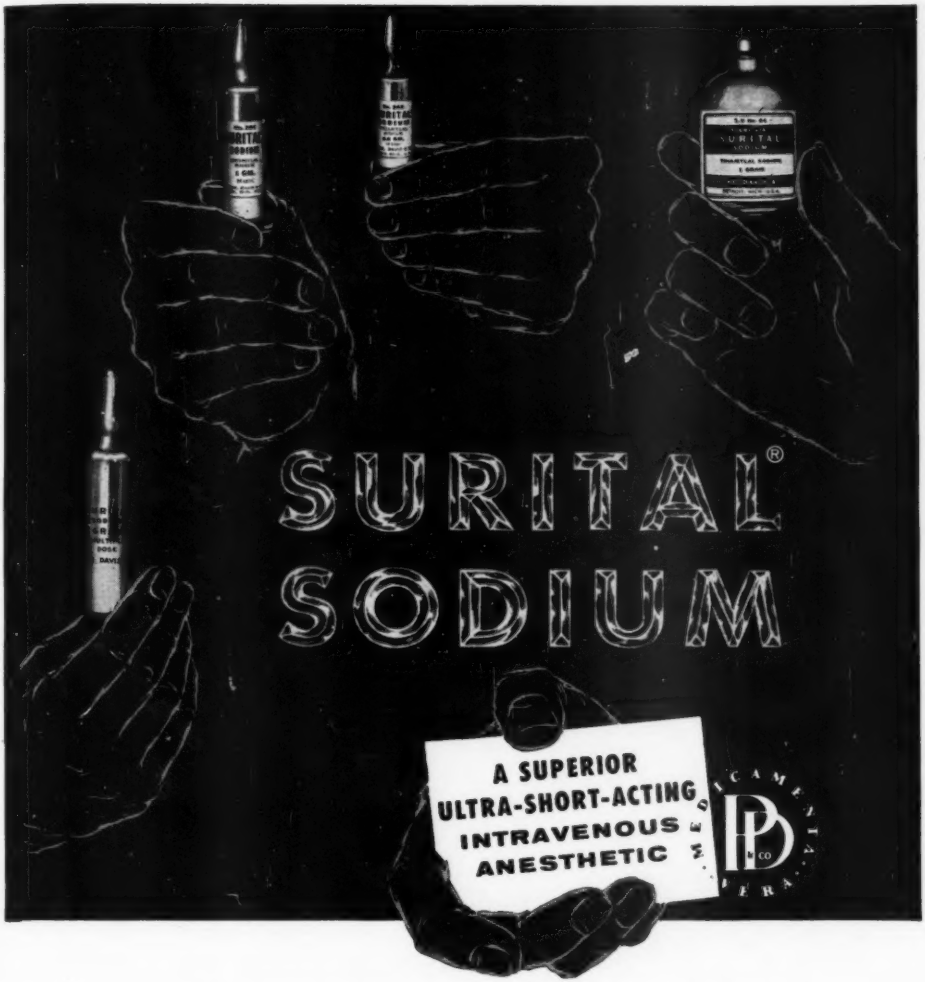

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References: 1. Brown, A. L., et al.: Vet. Med. 50:167, April 1955. 2. Agricultural Research Service, Losses in Agriculture, June 1954, Table 20, p. 129.

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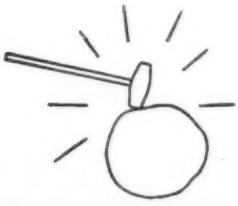

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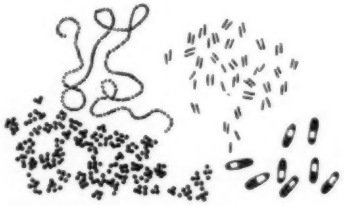

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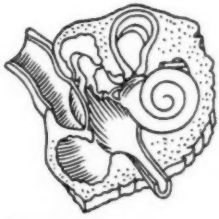

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Attend Your State Meeting

A large number of state and sectional veterinary meetings are scheduled regularly during the winter months. Traditionally, this is the slack season for veterinary practice. Other meetings are scheduled at opportune dates most likely to serve all those in a particular state or region.

Veterinarians will gather again in 1956 in ever increasing numbers and percentage of those serving areas in which meetings are held, to hear discussions on significant new research and experience findings that can be expected to serve directly both themselves and their clients.

Those in charge of programming for societies everywhere deserve support and rewards that come with attendance and interest. The good services of secretaries and program chairmen are never compensated adequately otherwise. All are encouraged to take advantage of the opportunity to attend respective state meetings and take an active part in deliberations planned to be of most value for members.

V V V

Consumer Demand for Pork

Comments by USDA officials and release of statistical information regarding the percentage of consumer's dollar spent for meats confirms the trend away from pork and a weakened competitive position with other meats.

"Over many years", USDA notes," consumers have turned away from pork toward beef." During the first three decades of the 20th century, a larger portion of the food dollar was spent for pork than for beef. Since 1930 the trend has been toward a merging of the line on the graph indicating a steady demand for beef and a weakening demand for pork cuts. Percentage expenditure for pork recovered briefly just after World War II, then slid significantly. The downtrend continued in 1955 in spite of only moderately large supplies, considered on a comparative basis.

Reasons given emphasize the general, growing dislike for fatter cuts (cattle feeders take notice) and waste of a major food item. Developments toward producing meat-type hogs are adjustments to consumer demands. Pace to affect preference will be stimulated as price differentials widen. Improvements may be expected to continue. Every other measure ought to be taken immediately by all interested agencies (breed associations, farm groups, packers) to consider ways and means of reversing the demand trend.

VETERINARY Medicine

Established 1905

Registered in U. S. Patent Office

A Monthly Magazine Devoted to the Promotion of the Art and Science of Veterinary Medicine

Vol. LI **FEBRUARY 1956** **No. 2**

Published Monthly by the

VETERINARY MEDICINE PUBLISHING CO.

Suite 803, Livestock Exchange Building
Kansas City 2, Missouri, U.S.A.
Telephone: Victor 2-2985

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SUBSCRIPTION RATES. One year, $5.00; two years, $8.75; three years, $12.00. Single copy, 50c. U. S. Funds. Postage prepaid. Authorized agents will present letter of collection authority. Pay no money to others.

Entered as second class matter at the post office at Kansas City, Missouri. Entered as second class matter under the title of the American Journal of Veterinary Medicine, July 19, 1910, at Chicago, Illinois, under the Act of March 3, 1879.

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CHANGE OF ADDRESS: Prompt notice of change of address is requested to assure accurate mailing, giving old and new address. Address all communications to Veterinary Medicine, Suite 803, Livestock Exchange Bldg., Kansas City 2, Missouri.

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AMERICA'S VETERINARIANS BRING TO LIVESTOCK OWNERS

THE SCIENCE of *health engineering*—

YOU—AS A VETERINARIAN—have a growing responsibility to America's livestock industry. No longer is it profitable for livestockmen or farmers to depend *solely* upon your skills and services for diagnosis, therapy or surgery.

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With this added opportunity for service also goes the responsibility for Squibb and the entire pharmaceutical industry to keep abreast of your needs—to provide new and improved veterinary drugs for disease prevention as well as treatment.

On the next three pages, you will find some of the ways Squibb is accepting this challenge, in your interest and that of your customers.

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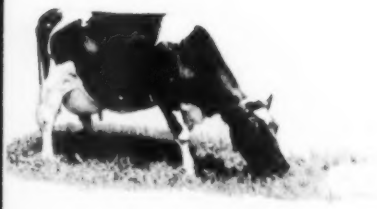

Vital allies in conquering livestock diseases or preventing disease are effective, reliable drugs. Vital allies in their discovery and development are the Squibb Research Laboratories in New Brunswick, New Jersey.

Here research never ceases. Highly skilled Squibb scientists—using the latest and most exacting techniques yet devised—continually seek *new* and *better* drugs, develop more effective applications of older ones. Because of their work, many dangerous and costly livestock diseases have been brought under control.

Trained technicians, too, constantly seek improved ways of producing Squibb veterinary products to assure highest uniformity, purity and potency.

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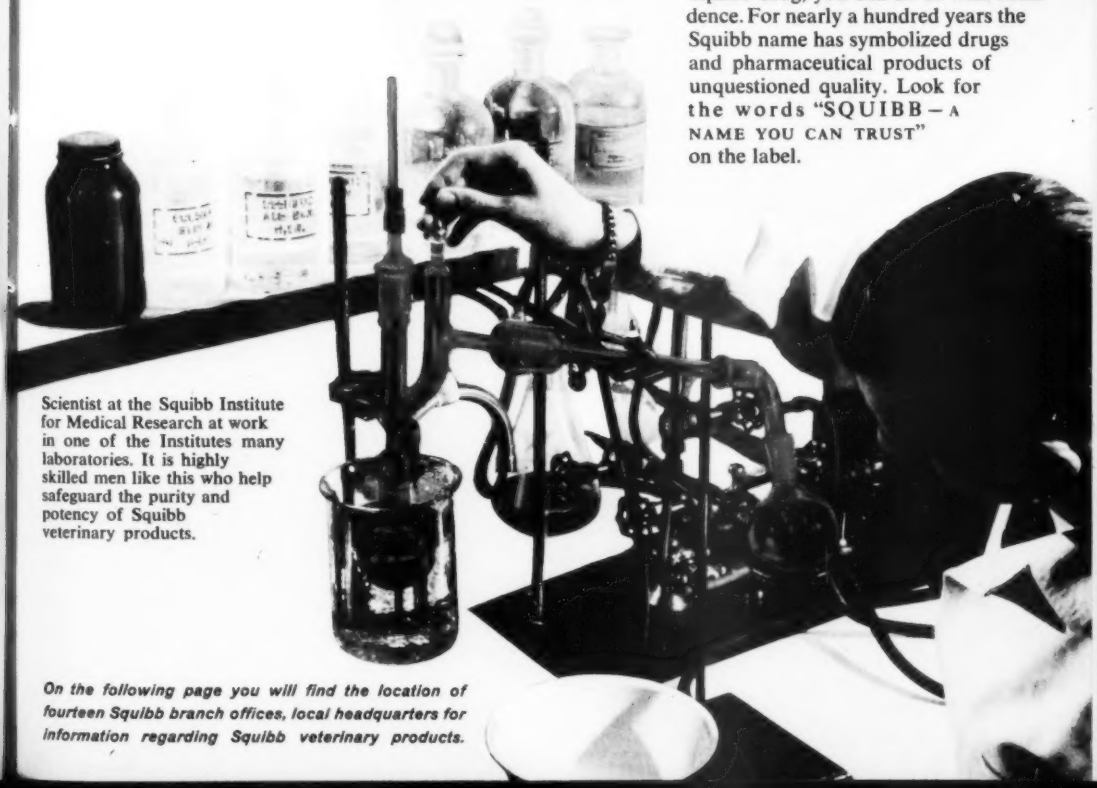

Scientist at the Squibb Institute for Medical Research at work in one of the Institutes many laboratories. It is highly skilled men like this who help safeguard the purity and potency of Squibb veterinary products.

On the following page you will find the location of fourteen Squibb branch offices, local headquarters for information regarding Squibb veterinary products.

14 BRANCH HEADQUARTERS FOR YOUR SQUIBB THERAPEUTIC NEEDS

Note the fourteen strategically located Squibb Branch Headquarters. Trained Squibb representatives at each will be glad to answer your questions regarding Squibb veterinary products and direct you to your nearest source of supply. The name and address of each headquarters is listed at the bottom of this page.

The broad scope of the Squibb veterinary program is indicated by the partial index of the therapeutic applications of Squibb veterinary products shown below. Specific product data and pharmacology are promptly available through any of the fourteen branch offices, or Squibb's executive office in New York City.

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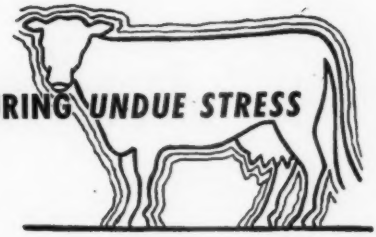

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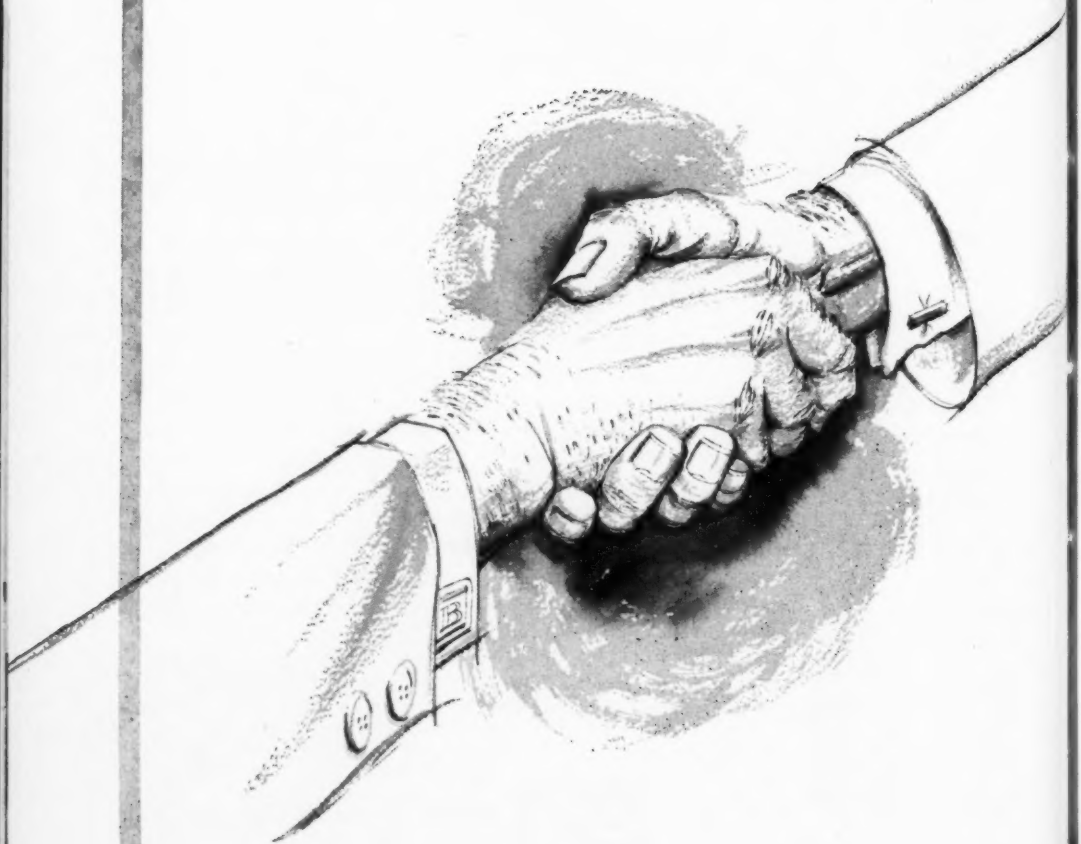

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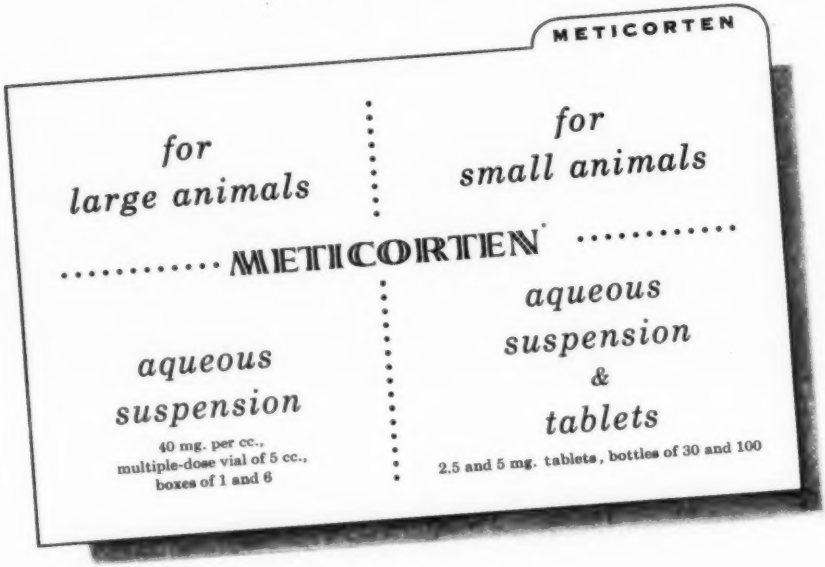
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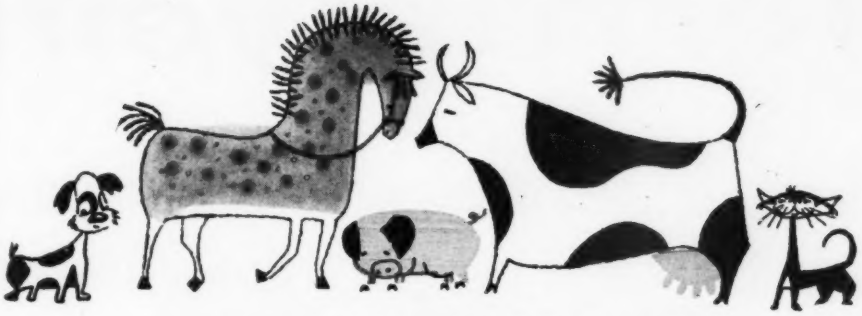

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1. Rachman, M., and Frucht, T. R.: Vet. Med. *49*:341, 1954.
2. Sternfels, M.: Vet. Med. *50*:82, 1955.

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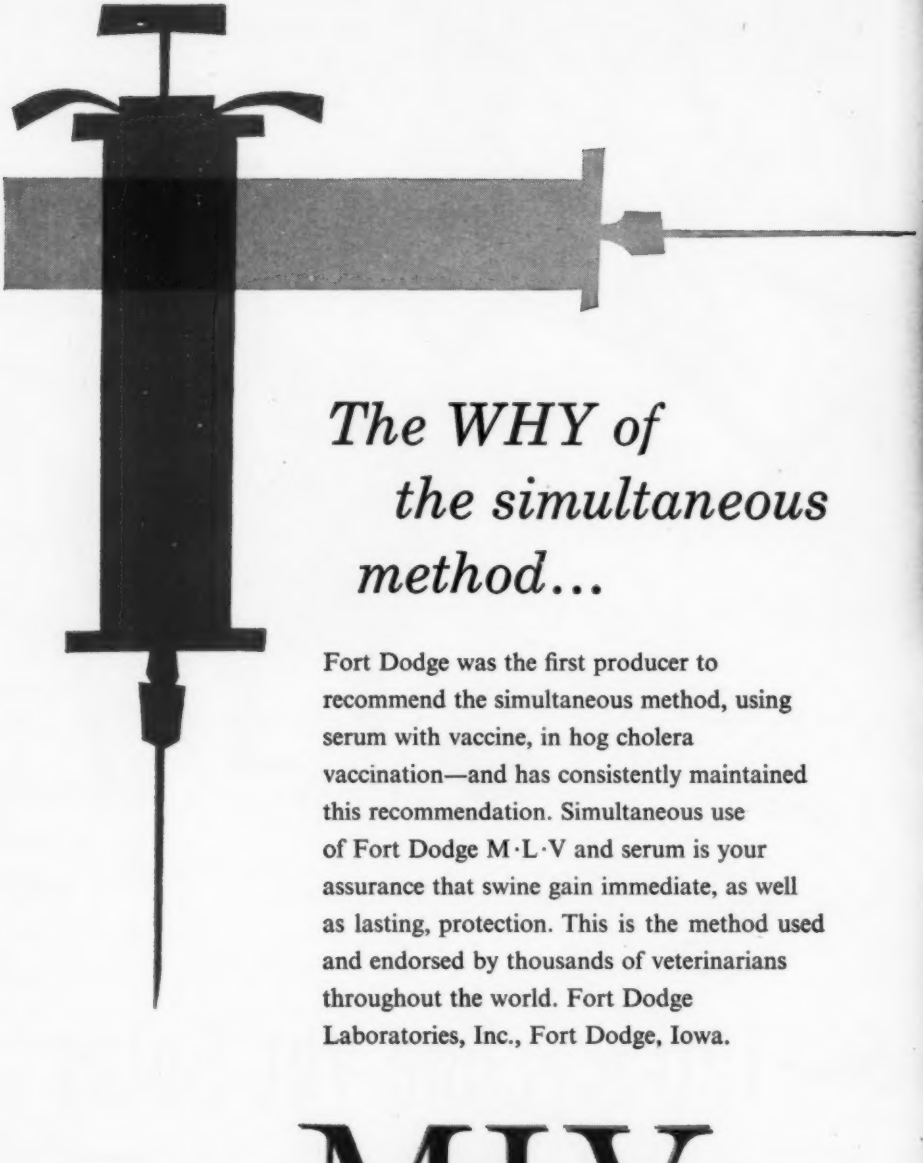

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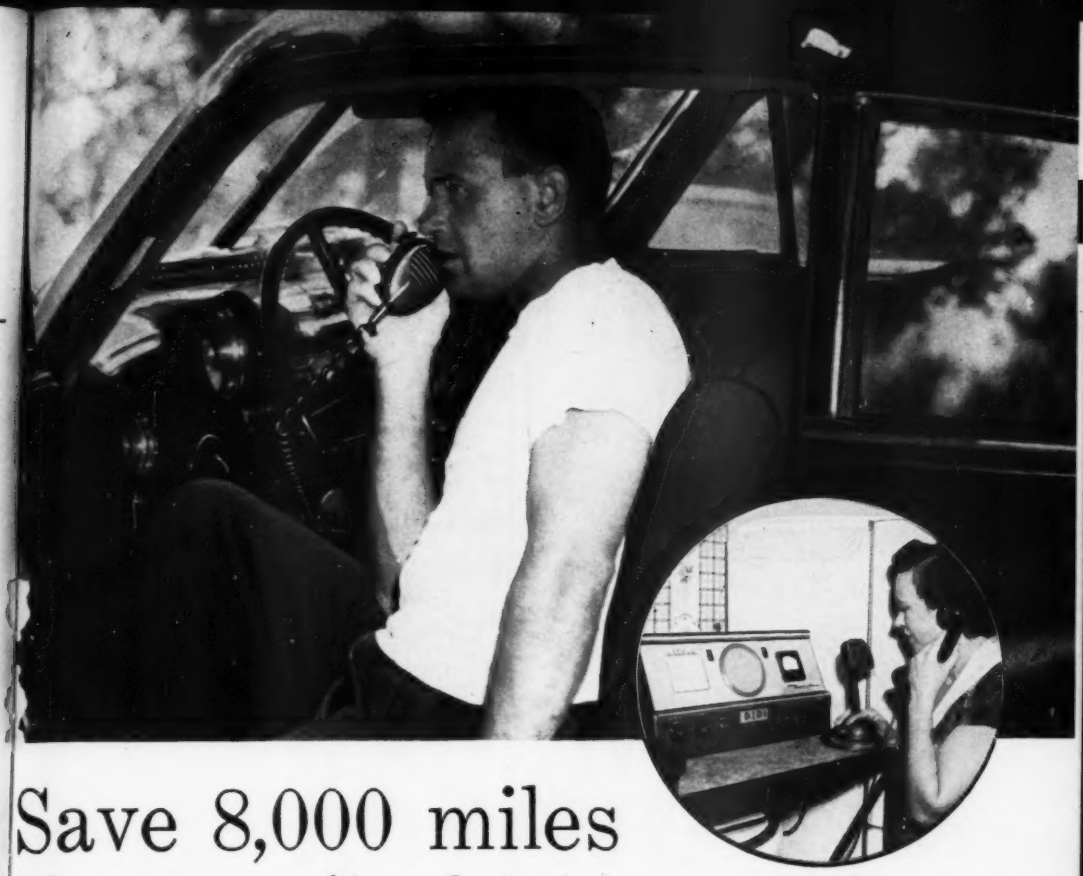

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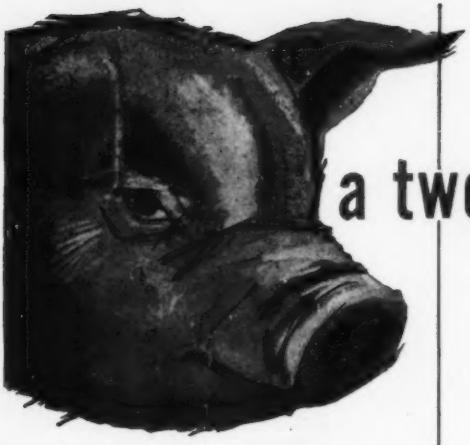

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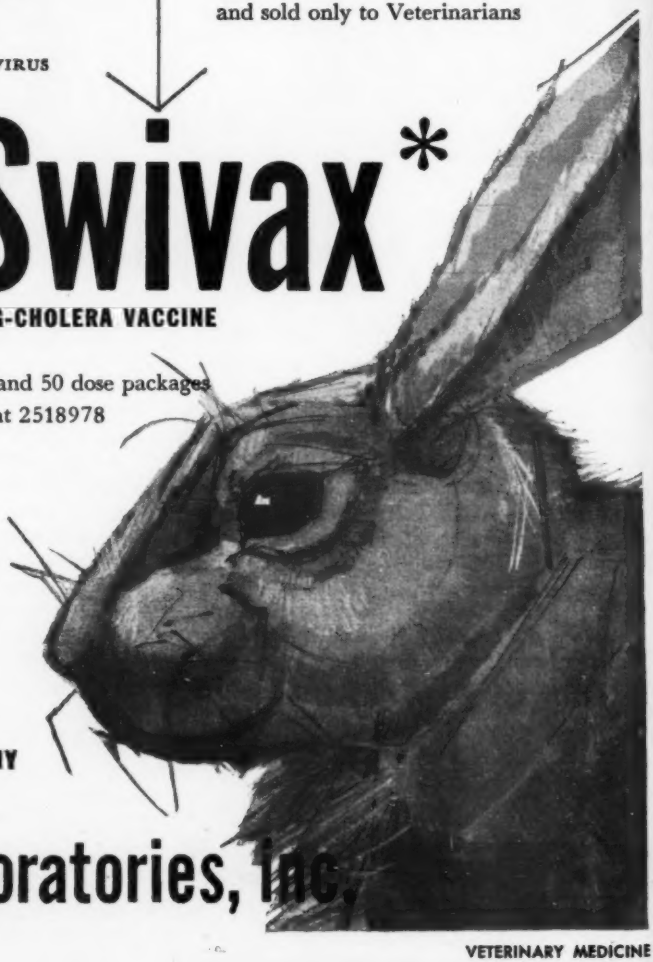

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Physical Properties Of Paunch Juice Which May Contribute To Bloating

R. E. NICHOLS, D.V.M., M.Sc., Ph.D., D.V.Sc., Madison, Wisconsin

THE last decade or so has brought with it an increase in the number of articles dealing with frothing as a possible major step in the development of legume and grain bloats. Certainly no one would infer that all types of bloat are "frothy bloats." One would, however, have a reasonable right to question whether, in the absence of paunch frothing, or with its adequate control, bloat still would be a digestive disorder of major economic consequence either in animals grazing legumes or in the feedlot. Certainly the least that can be said is that the process of frothing, factors influencing its onset, speed, and degree, as well as means of control, are deserving of more detailed study. If our present systems of grassland farming and feedlot finishing are to be improved for the benefit of agriculture and mankind, the necessity of a broad coordinated study of this problem will become more acute.

In any complex biological interaction such as occurs in the paunch of ruminants one can expect contributions to be made to the character of the material present in the paunch by the *plant*, the *animal*, the *microorganisms* in or introduced into the organ, and certain *other substances* such as water, minerals, air, et cetera, which contribute to the three chief biological systems and their interactions. It would seem unreasonable to assume that the relative physical and chemical contributions of each always would be the same. Rather, one might expect each to contribute according to its own variabilities. The remarkable feature of healthy paunch digestion is the "compatibility" of the three biological systems with its resulting balance in favor of growth, reproduction, and production. This compatibility appears to have been developed over the ages. There also seem to have been developed certain limits to these compatible interactions. These limits are also variable and when they are exceeded, the resulting incompatibilities also will be variable, in proportion to what limits have been exceeded and by how much.

The physical characteristics of paunch contents are dependent chiefly upon the nature of the chemical entities present and the chemical interactions which have been and are taking place. One can not expect the physical properties of paunch contents to become static with resulting fixed "normals" any more than one can expect the chemical interactions to become static. Digestion is a continuing situation and is characterized by changes and fluctuations. When these changes remain within limits which are favorable for the animal, we are inclined to refer to them as "normal changes." When they exceed these limits and become unfavorable, we refer to them as "abnormal."

Abnormal changes in interactions among the three biological systems may result from such extremes as a deficiency of a single element in feed or a total lack of nutrients. The production or addition of "foreign" substances may result in abnormal changes. One might

even include among abnormal changes a mere extension of a normal process beyond what can be accommodated by other healthy interactions among the biological systems; or even a mere increase in speed of a normal interaction as might result from an improvement in quality of feed for the microorganisms present in the paunch, without any "foreign" or "toxic" substances necessarily being a part of the initial changes of the interactions.

With the myriads of possibilities of changes and fluctuations in interactions among the three chief biological systems of paunch digestion, it is easy to see that a systematic approach to definition and evaluation of any appreciable number of these changes is well nigh impossible when attempted by single isolated groups of workers. Singular approaches to defining some of them, however, are constantly being made but usually lack adequate coordination for broad interpretation. Every time a new feed substance or a different quality of a feed substance is introduced into a feeding regimen, adaptive changes in the digestive processes are called upon. Sometimes adaptation apparently is quite simple, sometimes it is quite difficult but eventually successful, and sometimes it is not finally successful because vital limits have been exceeded. Studies of these adaptations are usually what is missing for reliable interpretation.

There is good evidence that momentary high pressures within the paunch, such as occur during coughing, can be tolerated by ruminants. Experimentally, it is possible for ruminants to tolerate, for a short time only, pressures of the magnitude reported in clinical bloat. Experimentally, pressures of this magnitude, if sustained, will result in death. The most universally recognized clinical sign of bloat is the anatomical swelling of the belly which is interpreted as being associated with an increase of pressure in the paunch. To say the least, it seems quite universally recognized that relief of the animal during the developmental stages of bloat follows an adequate and timely release of paunch pressure. If this relief is the result of eructation, can we rightfully say the animal actually had been in a diseased state? In other words, if the animal

Fig. 1. A young mixed ladino clover and brome grass pasture showing that the animals have selected and removed most of the grass blades in preference to the ladino leaves. Few legume pastures with palatable grasses in them are dangerous until the grass is gone and the animals have nothing to eat except the young clover. Shifts in the content and growth stage of pastures can result from weather changes. Wet weather usually allows legumes to dominate pasture species and may be followed by a greater danger of bloat. Careful observations of what plants animals are actually eating may save farmers considerable grief. When it is obvious that animals are seeking something to graze in preference to legumes some other palatable roughage such as hay or straw should be made readily available.

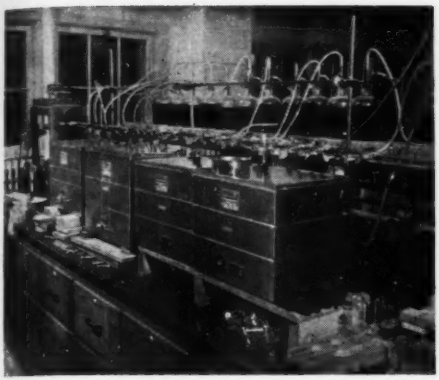

Fig. 2. Apparatus for extracting and measuring gas formed from samples of paunch contents subjected to constant agitation in a water bath maintained at body temperature. Any substance which materially interferes with gas production may be used for treatment of bloat but obviously should not be fed daily for prevention of bloat because it will interfere with normal digestion.

adapted itself by eructation to control of the effects of those processes of digestion which are conducive to pressure development, are we justified in saying that the animal actually bloated? If, on the other hand, the animal could not adapt itself to the pressure effects, would it die of bloat? I believe the answer is yes, regardless of whether inhibited eructation or augmented pressure production is the *primary* event.

It would seem logical that a rapid production of pressure might be as much a cause of inhibited eructation as the effect of inhibited eructation, if the pressure was produced by a kind of material in the paunch which is not ordinarily eructated, namely, froth. Frothing, *per se*, apparently is not an abnormal phenomenon of paunch contents. It can be observed in healthy, fistulated animals and in samples of paunch contents from healthy intact animals. The froth seems to be more stable during fresh legume or heavy concentrate feeding. There are times during feeding regimens of fresh young legume tops or of heavy concentrate-low roughage when the process of frothing is more extensive than at other times, even on the same feed. A sudden change from legume hay or grass to crisp, fresh, young, legume tops is often accompanied by increased frothing, sometimes following the evening feed of the day of change, sometimes following the next morning's feed or sometimes following a later feeding period. Occasionally following such a change in feed, volume of froth and speed of its development exceed what appear to be limits which can be tolerated by the pressure relief mechanisms of the paunch.

Changes in grazing habits can and do occur. The author has observed pastures on which bloat has occurred. Most of those observed have been mixed grasses and legumes, with the legumes being predominant. There was evidence, by observation, of what kind of plant material had been selectively grazed and what kind of plant material was being consumed at the time of bloating, that (1) grass had been consumed until little was left or until maturity apparently had diminished its palatability, (2) legumes had not been consumed in any appreciable quantity until the time of bloating, (3) little other than young legumes remained in the pasture in sufficient quantity to satisfy the animal's hunger, and (4) legumes were young, succulent, and were consumed rapidly once they were selected. None of the pastures were entirely pure cultures of legumes. Some stemmy material was always present. If the stemmy material was palatable enough to be eaten and it was selected for consumption, bloat usually did not occur until the legumes were selected.

A similar situation seems to be present in manger feeding of the leafy portions of fresh legumes. Excessive frothing with excessive pressure can occur in fistulated animals with fairly tight plugs and caps even if free gas can escape. Excessive frothing does not occur if much stemmy material or grass is selected and consumed, but only when intake is limited almost entirely to young, leafy, fresh, crisp

Fig. 3. Tensiometer for measuring surface tension of paunch juice. Feeding fresh legumes causes an almost immediate but transitory increase in apparent surface tension, one factor which may contribute to the excessive frothing usually associated with legume bloat. Water may cause a similar increase in surface tension. (Operator's name is Joan Schreiber.)

legume tops. Not every change from hay to fresh legumes results in excessive frothing. Animals do not always consume the same amounts of feed in the same length of time. Rapid eating of fresh plants seems to be associated with periods of increased frothing as undoubtedly are many other factors controlled by the animal voluntarily. Purposely changing the feed of an animal from manger-fed hay or grass to manger-fed fresh legume tops is thought to approximate a circumstance which can occur in pasture when the animal decides to select the young legume tops.

Fig. 4. Viscosimeter for measuring the relative viscosity of paunch samples. Feeding fresh legumes is associated with a tendency for more viscid paunch contents, which can contribute to the excessive frothing associated with legume bloat. Viscosity is increased more often during sudden changes from hay to fresh legumes. Increases in viscosity of paunch contents may occur rapidly and may disappear just as rapidly. (Katherine Penn is the operator.)

Necropsies of animals bloated on young legumes often reveal frothy paunch contents. Treatment of animals in distress on legume pastures is often more successful with defoaming agents than by simple puncture of the paunch. In manger-fed, fistulated animals relief of excessive pressure from frothing produced by sudden changes from hay to fresh, young legumes can be accomplished by defoaming agents and by removing the fistula plug cap, allowing the rapid expulsion of frothy digesta. After relief, these animals show no other deleterious signs, often return to eating within a short time and usually consume feed at a slower, more cautious rate. Defoaming agents are effective in controlling frothing experimentally. Their practical application in prevention, however, is quite different, because of such limitations as palatability, speed of solubility, dispersion in the paunch, length of effective activity, toxicity, et cetera.

The introduction of new feed into a healthy paunch stimulates greater microbial activity, a situation which seems to be a necessary prerequisite to excessive frothing, even though such stimulation, *per se*, does not result in an increase in frothing each time that stimulation occurs, nor should it be considered an abnormal process of the microbial system. This stimulation seems to be proportionate to the quality of the feed. In addition to stimulation of microbial activity, physical changes of paunch material conducive to the trapping of bubbles within the digesta seem to be necessary as well. An extension of the frothing process into the depths of the paunch also appears to be necessary before excessive pressures are produced in fistulated animals, a condition favored by the greater reduction in paunch juice buoyancy following fresh legume feeding as compared with the feeding of hay or grass. Necropsies of animals killed by frothy bloat suggest that a similar extension exists prior to death in intact animals also, whether free gas is present in large quantities or small. The amount of pressure developed

Fig. 5. A rumen sampling tube used to obtain samples of paunch juice from any area of the organ without admixture of neighboring juice. The tube slot is closed when the tube is introduced. It is opened when in the desired area of the paunch, contents of the area flow through the slot into the tube, the slot is then closed and the tube removed. Examination of contents at various levels and areas of the paunch suggest that the motility of the rumen is not such as to render an homogenous mass of the contents but that there are definite patterns of digestion of different kinds of feed, some more conducive to bloating than others.

in the paunch is the vital limit, regardless of whether it is produced by large quantities of gas plus froth, small quantities of gas plus froth, or other causes.

There is evidence, meager as it may be, that physical changes in paunch digesta conducive to bubble retention do occur, particularly during the first few days of fresh legume feeding. After a change from alfalfa hay to fresh, young ladino tops, apparent surface tensions and relative viscosities of strained ventral paunch juice have a tendency to increase. Periods of increased frothing seem to coincide with periods of increased viscosity, periods of excessive frothing with excessive increases in viscosity.

Were it not for the fact that good defoaming agents in minimal effective doses reduce surface tensions of paunch juice but rarely significantly reduce viscosity, one might hastily jump to the conclusion that viscosity changes are the sole physical changes of importance. But effective froth reduction can be accomplished by good defoaming agents without significant reductions in viscosity, which certainly leads one to be cautious of assigning extra significance to any one physical change. If this caution is required with physical changes, then it also must be applied to the chemical changes which are responsible for the physical changes. If one could separate out the multitude of chemical constituents of paunch digesta, he would find no two with exactly identical physical properties, some additive perhaps, and some opposing each other. Similarly, the multitude of possible chemical reactions among the vast number of chemical constituents result in a multitude of additional different physical changes. Each physical property of paunch digesta then represents a kind of balance between additive and opposing forces, some being of more relative importance than others.

Measurements of changes in the physical properties of paunch juice, have been used logically as guides for locating those compounds which appear to stimulate froth stability, as well as those compounds which appear to stimulate microbial activity. Considering that the physical properties of paunch juice represent a balance between additive and opposing forces, it would seem far too limiting to attribute major importance in froth development to any single compound either in the plant alone, in the animal alone, or in microbial activity alone, before examining more closely at least some of the more complex interactions of the three biological systems which occur during the processes of digestion.

Centrifugation of aliquots of paunch samples consistently results in significantly lower viscosities and higher surface tensions than result from simple straining through cheese cloth to remove coarse particles, a fact which demonstrates the contribution of the mere physical presence of particulate material to the ultimate balance of these two physical properties of digesta. Yet, the liquid phase of paunch juice often is higher in viscosity and surface tension during legume feeding than during hay feeding. The greater dispersion of particulate material causes an associated increase in viscosity. *Vice versa,* an increase in viscosity of the liquid phase finally results in a more stable dispersion of the particulate material. Our interpretation must include both phenomena.

It is possible to demonstrate that foaming of paunch juice will continue to proceed upward in foaming columns provided bubble

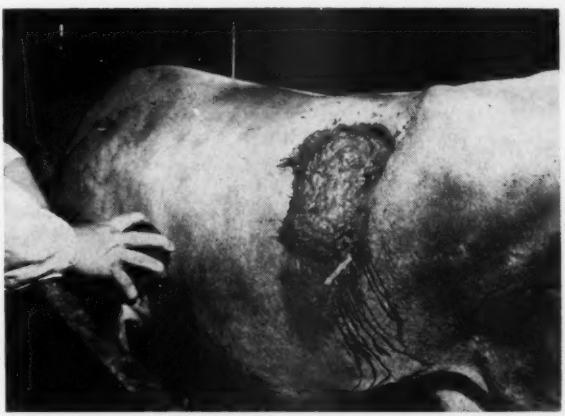

Fig. 6. Frothy paunch contents, which can become sufficiently frothy during experimental changes from alfalfa hay to fresh legumes to endanger the animal's life. Extension of the frothing process to include practically all of the contents of the paunch can occur very quickly, can disappear equally as quickly and is considered by some to be the important problem in both legume and grain bloats. During the forming stage, frothiness can be effectively reduced by many surfactants including many of the common household detergents. Prevention of excessive frothiness by low level feeding of safe surface active substances is a promising possibility provided such substances will fit accepted feeding practices and provided gains by their use will exceed their cost.

skins do not break and provided the liquid phase is not depleted in the manufacture of the bubble skins. During induced, excessive paunch frothing in fistulated animals it is more difficult to obtain any appreciable quantity of "free" fluid by straining the frothy digesta from the lower regions of the paunch than it is when frothing is not excessive. This is also true in the frothy ingesta of animals afflicted with frothy bloat. It would appear that an extensive frothing requires a large volume of liquid phase. Could the drinking of water during a period of active microbial stimulation and bubble retention augment bloat?

Thermostabile, water soluble, dializable extracts of legumes have been shown to stimulate microbial activity and also froth stability. Eating fresh legumes does the same. May not, then, the *excessive* frothing associated with legume bloat be merely a matter of an *extension* of *normal* paunch digestive processes beyond the limits of tolerated paunch pressures? Is it not probable that the limiting factor in bloat is the amount of paunch pressure that an animal can tolerate rather than any abnormal interaction between plant and microorganisms? Is it also not probable that a limitation of the foam stabilizing constituents of plants, perhaps by breeding, may be necessary for the prevention of bloat rather than attempting to extend the pressure limits of the animal or to control the digestive capacities of the microorganisms? Further fractionations of digestive products, and evaluation of their relative contributions, both physical and chemical, should shed light upon this question. Perhaps we are at a place in research on bloat where we need to add many independent findings to obtain a broader concept of this problem rather than trying to find any single entity in the plant as a single cause. Is it not likely that several entities are contributory even though they may not be abnormal ones?

▼ ▼ ▼

Erratum

Reference is made to a statement regarding losses directly attributed to ketosis in dairy cows that appeared on page 478 of the October 1955 issue of VETERINARY MEDICINE.

Source of information and figures was Losses in Agriculture, A Preliminary Appraisal for Review, issued by the Agricultural Research Service in June 1954. Annual production of milk is placed at 116,217,900,000 lb. having value of $4,228,375,000. Actual loss of production is estimated at $5,000,000.

Prolonged Gestation with Dystocia on a Grade Guernsey Holstein Cross

The dam with the fetus, which caused the dystocia, was a black and white grade Holstein cow, believed to be one-half Holstein, one-quarter Jersey, and one-quarter Guernsey. She was a family cow weighing 1300 lb. or less. She had been bred to a Curtis Candy Company bull, a purebred Ayreshire, named Swanky Admiral, on July 31 and again on August 21, 1954 and started to calve 383 days after the last service.

Dr. Fred Holmes of Glens Falls, New York, removed the calf with relatively little difficulty by the use of a Frank fetal extractor, but the jack had to be adjusted three times on account of the great length of the calf. The cow was up when the operation was started, but went down during the traction.

The cow got to her feet after calving, expelled placenta promptly, and made a complete, spontaneous recovery, milking as much as 45 lb. daily three days after parturition.

When the calf was delivered, it was noted that it was mostly skin and bones and had a large head with teeth developed to the same degree that a yearling heifer's teeth would be developed. This female fetus also had long, large teats, measuring 1 to 1½ in. in length and two large supernumerary teats. Hooves were three to four times normal length. The hair was long and shaggy and there was an abundance of meconium in the placental fluids. The actual weight of the fetus after delivery was 127 lb. when the size of the cow would have called for a much smaller calf.

This apparently is not the same type of prolonged gestation that has been described previously in Holsteins by Gregory and Jasper since those animals gave no milk or had no udder development at the time of their calving. It is not like most of the monstrosities that were carried long periods in Guernseys because most of the Guernseys died as did the fetuses. This fetus apparently had not been dead long before the traction was applied.—*Fred Holmes, D.V.M.*

▼ ▼ ▼

Twenty-five cents worth of penicillin is claimed to be sufficient to effect relief of symptoms of yaws in a child. An estimate places those affected in Africa alone at 25,000,000.

The Use Of Hydrocortisone Intravenously In Animals Under Severe Stress

W. B. BOUCHER,* V.M.D., C. J. HOLLISTER,* D.V.M., and C. W. RAKER,* V.M.D., Philadelphia, Pennsylvania

THE frequency of surgical shock and the frequency of severe, toxic, surgical cases that confront the practitioner and the difficulty in bringing them to a successful conclusion, point out the need for better methods of treatment. The successful use of intravenous hydrocortisone in human patients in acutely critical situations[1,2,3,4,5] led us to believe that similar benefits might be derived in the veterinary field.

In the following case reports detailed information as to antibiotic therapy has been deleted as irrelevant to the purpose of the report. Many of the cases, particularly numbers, 1292, 1313, 1454, 1508, and the mare, were particularly poor surgical risks and, therefore, the response is dramatically highlighted.

The authors recognize that intramuscular cortisone may be substituted for the intravenous after the patient has responded to the emergency situation.

Case Reports

Case 1290. Guernsey cow (four years of age) presented for Cesarean section with 180° torsion of the uterus. General appearance of the animal was good.

Procedure. Surgery performed under local anesthesia. Prior to incising the uterus, an attempt was made to correct the torsion. The skin became cold and clammy, mucous membranes became pale, general weakness became apparent, veins were collapsed and the blood was dark and thick.

A drip of 2 liters 5% dextrose and physiological saline with 500 mg. hydrocortisone† was begun. In 15 minutes the cow's mucous membranes became pink, she became stronger and more alert, and within 30 minutes appeared to be entirely recovered. The cow made an uneventful recovery and was discharged several days later.

Case 1292. Guernsey heifer (2½ years) presented for Cesarean section with a history of being in labor for 15 hours. Twin pregnancy with one calf in abnormal presentation prevented normal delivery. The heifer was depressed and the mucous membranes were injected. Respirations and pulse rates were accelerated. Temperature 103 F.

Procedure. The twin calves were removed from the uterus together with approximately half of the placenta. At this time the heifer exhibited weakness and a further acceleration of the respiration occurred with a decided grunt.

At this time intravenous administration of 2 liters of 5% dextrose and physiological saline with 500 mg. hydrocortisone was begun and completed in one hour. Within two hours from the time the infusion was started, the heifer showed decided improvement and from that time made rapid progress. The remainder of the placenta was passed on the third day without manual assistance. On the tenth day the cow was eating and milking well.

Case 1313. Guernsey cow (three years). A torsion of the uterus had been corrected the evening before but there had been no dilation of the cervix. The following morning she was presented for Cesarean section. The animal was down and unable to arise. There was marked depression and dyspnea, mucous membranes were injected, and the fetus was emphysematous.

Procedure. Surgery was performed under local anesthesia. During surgery 2 liters of 5% dextrose and physiological saline with 500 mg. hydrocortisone were given intravenously.

The abdominal cavity contained large amounts of wine-colored fluid. The emphysematous fetus was removed and antibiotics placed *in utero* and abdominal cavity. After completion of the surgery, the cow appeared

*Assistant Professor of Veterinary Medicine, School of Veterinary Medicine, University of Pennsylvania.

†Hydrocortisone infusion concentrate in 50% alcohol supplied through the courtesy of Dr. S. F. Scheidy, Veterinary Medical Director, Sharp & Dohme, Philadelphia, Pennsylvania.

much brighter and proceeded to make an uneventful recovery.

Case 1382. Holstein heifer (two years) was presented for Cesarean section. Temperature was 102 F.; pulse 120. This cow was down and refused to arise. Labor had proceeded for about eight hours.

Procedure. Surgery was performed under local anesthesia. During surgery 2 liters of 5% dextrose and physiological saline with 150 mg. hydrocortisone were administered. The pulse rate dropped to 89 by the time surgery was completed. The heifer was up within 12 hours and made a rapid recovery.

Case 1454. Holstein cow (seven years) was presented for examination. History in this case indicated that a torsion of the uterus had been present for seven days. The cow's temperature was 103 F., pulse rate 90 and weak. The hair coat was rough, skin tone poor, and the eyes sunken.

Procedure. Torsion was reduced by rotation of the cow in recumbent position but the fetus could not be delivered because of the constriction of the cervix.

The dark red placenta from the non-gravid horn and copious quantities of dark red fluid were expelled from the uterus. The uterus was edematous and was of a leathery texture. Surgery was performed under local anesthesia.

The abdominal cavity contained large amounts of dark red fluid. The uterus was lavender in color, swollen and friable. A large fetus, together with an edematous and dark red placenta was removed. Closure of the uterus required three rows of inverting sutures.

Antibiotics were placed *in utero* and in the abdominal cavity. An intravenous drip of 1 liter of 5% dextrose and physiological saline with 30 mg. of hydrocortisone had been started at the beginning of surgery. The temperature at the start of surgery was 103 F. and the pulse rate 105.

During the next eight hours, 2 liters more of solution containing 300 and 200 mg. of hydrocortisone respectively, were administered. The pulse varied between 75 and 108, the temperature had dropped to 102 F. and did not rise over 102.2 F. thereafter.

Twenty hours after surgery the pulse dropped to 80 and remained under 90 thereafter. Two further intravenous doses of 100 mg. of hydrocortisone in dextro-saline were given 20 hours and 26 hours after surgery. The cow had begun eating hay and grain during this time, made satisfactory progress and was discharged on the seventh day.

Case 1508. Holstein cow presented for Cesarean section. The fetal presentation was posterior with the legs retained and the fetus very emphysematous, according to history. Labor had begun 24 hours earlier.

Procedure. Surgery was performed under local anesthesia. A diffuse peritonitis was evident, together with copious quantities of dark-colored fluid.

While removing the fetus and decomposed placenta, the surgical area was flooded with foul fluids and detritus. Antibiotics were placed *in utero* and in the abdominal cavity.

During closure of the uterus, a liter of 5% dextrose and physiological saline with 100 mg. of hydrocortisone was administered. The heart rate at this time was 120, the pulse indistinguishable. In 2½ hours, at the completion of the drip, the pulse was 88; but three hours later had risen to 120 and a dyspneic respiration rate of 50 was present.

Within the next six hours, two courses of 100 mg. of hydrocortisone in 500 cc. of 50% dextrose were administered. The pulse and respiration remained unchanged.

Eighteen hours after surgery, the final dose of 100 mg. of hydrocortisone in 500 cc. of 5% dextrose and physiological saline was given. The pulse at this time was 60 and the respiration rate 24. Water was being taken and a few hours later the patient began to eat a little. Progress was slow for about 48 hours after which improvement was rapid except for wound infection which required treatment. Milk production was 17 lb. 11 days after surgery.

Case 1556. Hereford cow (six years). History revealed anorexia for one week, rumen inactivity, diarrhea, dullness. Temperature 102.4 F.

Procedure. Routine operation for traumatic gastritis. On the following day respirations had accelerated, were shallow and accompanied by grunting. The temperature was 101.3 F. but the attitude was anxious, the rumen inactive and the cow was drinking considerable water. Cortisone (250 mg.) with 2 liters of 5% dextrose and physiological saline were given intravenously. However, the animal's condition deteriorated rapidly and the cow died 12 hours later.

There was pneumonia in the right diaphragmatic lobe from perforation of the dia-

phragm by the foreign object. An abscess in the region of the reticulum and an unhealed perforation of the reticulum with local peritonitis were found.

Case 1. A seven-month-old, purebred, Jersey heifer was presented for intramedullary pinning of a supracondylar fracture of the distal end of the femur. Reduction and fixation were accomplished. Supportive therapy in the form of fluids and antibiotics was administered post-operatively for several days. On the fifth post-surgical day the temperature was 106 F., respiration 120 and dyspneic, and pulse rapid and weak. Hydrocortisone (100 mg.) was added to 500 cc. of 5% dextrose and this was administered intravenously by drip.

Improvement was noticeable during the following 12 hours as evidenced by a decrease in the respiratory rate, improvement in quality and rate of the pulse, and drop in temperature to 102 F. An additional 100 mg. of hydrocortisone was administered intravenously in 5% dextrose. Improvement continued during the next 36 hours.

On the seventh postoperative day the general condition again became serious, with death following within 24 hours. Necropsy revealed infection with necrosis at the site of open reduction of the fracture.

Case 2. A Thoroughbred mare was presented with evidence of colic. A diagnosis of strangulation of the small intestine was made. Surgical intervention was attempted. The temperature was 103.8 F., mucous membranes muddy, pulse 104 and weak, respirations shallow and rapid and the mare had broken out into a cold sweat. Hydrocortisone (500 mg.) added to 500 cc. of 5% dextrose was administered intravenously. Before the venaclysis was completed, the pulse rate had decreased to 88 and had improved in quality. Perspiration stopped and the mare was alert and arose unassisted.

Surgical correction of the strangulation was performed, and during the operation 5% dextrose and intravenous antibiotics were administered intravenously. A second administration of 500 mg. of hydrocortisone was given intravenously and the surgical correction completed. Recovery from the anesthesia was normal, but death followed 8 hours later.

Case 3. A Guernsey cow was presented with hydrops amnii. Presurgical examination revealed a temperature of 102.6 F., pulse 114, and respirations shallow and rapid.

Procedure. Cesarean section was performed under local anesthesia. Upon opening the uterus, an estimated 50 gallons of amniotic fluid escaped from the uterus, with as much as possible being drained back into the peritoneal cavity in an attempt to prevent or lessen the development of shock.

Almost immediately the pulse became impalpable and the patient lapsed into a state of shock. A venaclysis of 500 mg. of hydrocortisone added to 1000 cc. of 5% dextrose was begun at once by drip and was continued throughout the remainder of the surgery.

At the completion of the Cesarean section, the cow was allowed to stand. The temperature was 102.6 F., pulse 136, respirations shallow and rapid. During the next 48 hours three additional doses of 100 mg. hydrocortisone in 500 cc. of 5% dextrose were administered intravenously. After each administration of the hydrocortisone, improvement was noted in the general attitude as well as in the pulse and temperature. The general trend shown was for a decrease in the temperature. On the third postoperative day the cow's condition was no longer considered critical and recovery followed.

Summary and Conclusion

Intravenous hydrocortisone diluted with 5% dextrose and physiological saline was administered to animals that were under severe stress. Nine surgical cases are reported.

This report indicates that the use of intravenous hydrocortisone is advantageous in treating animals acutely embarrassed by surgical shock and in supporting severely toxic animals through critical periods.

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Intrathoracic And Intratracheal Treatment Of Infectious Bovine Rhinotracheitis

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THIS paper supplements the description of rhinotracheitis of cattle presented by Miller[1] and offers a method for more direct application of antibiotics in the treatment of this disease, namely, by introduction into the trachea as well as intrathoracically. This method should be used in conjunction with, or as an alternative to, other routes of administration. The work has been conducted in cooperation with veterinarians and feed lot owners credited below†.

Description of Disease

Miller describes rhinotracheitis, or, as it also might be called, pneumorhinotracheitis, and more recently referred to as infectious bovine rhinotracheitis, as it occurs in Colorado. We also have observed a similar clinical condition in Colorado, and, in addition in feed lots in South Dakota and Illinois. California observations do not necessarily indicate pneumonia to be a constant feature, although other clinical signs are similar to the Colorado type.

Rhinotracheitis affects the entire upper respiratory tract and may be accompanied by pneumonia. It is characterized by high fever, dehydration, and acute inflammation of the anterior and posterior nares, pharynx, and bronchi. Thick, purulent mucus accumulates in these areas and there may be diphtheritic membranes, according to Miller[1]. Most striking is the necrosis of the mucosa, the extent of which differs according to various observers and apparently according to geographical location.

It appears that severity of tracheal lesions increases markedly from West to East. In California, we found lining the trachea in most cases, a white, exudative, sometimes foul-smelling material 1/32 in. or less in thickness. In Colorado, we observed usually a yellow, greasy exudate, often blood-tinged and foul-smelling. There is a cauliflower-like appearance of the encrusted surfaces. This exudate may be ⅛ in. or more in thickness. In Illinois, the exudate is more decidedly blood-tinged, often with rice-sized clots interspersed in a foaming yellow butter-like exudate.

We were unable to relate differences in the appearance of the exudates in different regions to chemicals or feed ingredients which might have been inhaled. Some cattlemen suggest that differences in relative humidity may be an important factor.

In most of our observations made in California, we did not find necrosis of the tracheal mucosa underlying the exudate, although Miller[1] indicates that necrosis is more generally prevalent in animals he observed in Colorado. Nor do we consider the exudates observed typical diphtheritic membranes.

The sinuses and internal nares of both the California and Colorado variety of the disease, according to our observations, show a mild to severe hyperemia of the mucosal linings. The Illinois variety may be severely hyperemic and hemorrhagic to the point where the sinuses are filled with clotted blood. At slaughter, 30 to 40 days following illness, recovered animals retain much of their nasal mucosa. However, there are relatively large areas devoid of cilia in both the nares and the trachea.

To assist in differential diagnosis of rhinotracheitis in cattle, we include a table comparing symptoms with those of several similar diseases. These are the signs readily observed by practitioners. Data on mucosal disease and virus dysentery disease have been furnished by Drs. F. K. Ramsey, Ames, Iowa, P. D. Beamer, Urbana, Illinois, and W. R. Pritchard, Lafayette, Indiana. We acknowledge also the suggestions and help of Dr. D. G. McKercher,

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*Chas. Pfizer & Co., Inc., Agricultural Research and Development Dept.

**Participant from University of Illinois in Pfizer summer graduate student program.

†We acknowledge the cooperation of feed lot owners Edward Bolinger, H. Epstein and Kermit Wall, and Drs. E. T. Metz and G. D. Ruebel, Brush, Colorado; D. R. Mackey, Greeley, Colorado; and W. P. Matulich, San Bernardino, California.

Davis, California, and Dr. R. G. Carlson, Lafayette, Indiana.

Treatment

Treatment of rhinotracheitis and related diseases often has been by conventional intravenous, intramuscular, or intraperitoneal use of antibiotics. Except for early, noncomplicated cases, responses to these treatments have been variable. This may be due to the capillary congestion in later stages which retards circulation and probably prevents attainment of effective therapeutic concentrations at the site of the infection. For greater effectiveness, we have applied antibiotics by intrathoracic and intratracheal injection to produce high therapeutic antibiotic levels in the respiratory exudates and fluids.

Technic of Intratracheal Injection

With the animal restrained in a branding chute and the head held to one side by nose tongs, a 2½-in. 14- or 15-gauge standard spinal-type needle is thrust through the hide on the ventral median line two or three inches posterior to the larynx. The trachea is grasped with one hand and the other urges the needle into contact with the trachea. When the needle point is felt to slip off one of the tracheal rings, the insertion is completed. Characteristic breathing sounds indicate that the needle has been properly located. Attach syringe and complete the injection.

In our work we have used 100 - 200 mg. per cc. of intravenous terramycin® in equal parts of sterile water and USP glycerine. Dosage ranges from 5 to 40 cc. Dr. Robert Pierson, of Saratoga, Wyoming, has recommended injection of 1,000,000 units of crystalline penicillin in 3 to 5 cc. of saline.

In order to loosen necrotic debris, it may be helpful to include a proteolytic enzyme with the antibiotic. The authors have used both lyophilized crystalline trypsin (tryptar vet® Armour) and pancreatic dornase, (dornovac® Sharp & Dohme). We have administered 50,000 to 200,000 units of enzyme intratracheally with the antibiotic. Reports[2,6] on the use of enzymes in bronchopulmonary disease and other conditions in veterinary and human medicine have shown no untoward effects. Some animals with rhinotracheitis may expel 4 to 6 oz. of fetid material from the nostrils

®Chas. Pfizer & Co., Inc. Brooklyn, N. Y. brand of oxytetracycline.

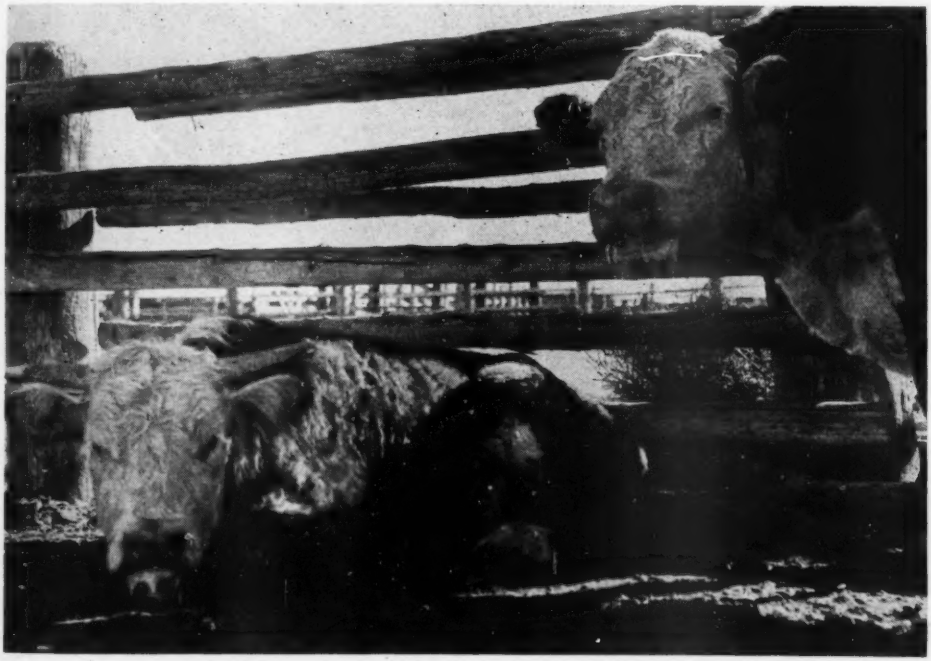

Fig. 1. Rhinotracheitis showing characteristic drooling and mouth breathing observed about the fifth day in untreated cattle.

Comparison of Diagnostic Clinical Signs — Febrile Diseases of Cattle-Fever Range 103-109F.

All symptoms need not appear in a single case at the same time. Rarely does one animal manifest all symptoms.	Days Onset (individual)	Days Sickness (untreated)	Weeks to spread through herd	Morbidity (percent)	Mortality (percent - untreated)	Rhinitis (congestion)	Erosion of nasal mucosa	Excess lacrimation	Corneal ulcers	Congestion, visible mucous membranes	Tracheal lesions-necrotic, exudative	Pneumonia (gross)	Excess pleural fluid, sometimes fetid	Stomatitis, ulcerative	Peridontal lacing	Diphtheritic larynx & pharynx	Esophageal ulcers	Abomasitis (hemorrhagic)	Intestinal ulcers, "Non-inflammatory" appearance	Enteritis - colitis, etc.	Sloughed Pyer's patches	Emaciation, Dehydration, Weakness	Cyanosis, dizziness	Encephalitis	Abortion	Salivation - drooling
Mucosal disease		5-15+	1-2	2-50	90+	+	+	+	—	—	—	—	—	+	+	—	+	±	+	+	+	+		—	±	Sticky Stringy
Calf diphtheria	3-5	4-28	1-3	3-5%	90+	—	±	—	—	±	+	±		+	±	+	±	—	—	±	—	+		—	—	
Rinderpest*	2-9	4-7	3-4	50-95	50-95	+	+	+	±	+	+	+	±	+	+	±	—	+	—	+	±	+	+	+	±	Not[18] Stringy
Bovine* pleuro-pneumonia	14-21	7-28	2-6		30-40	+	—	—	—	±	—	+	+	—	—	—	—	—	—	—	—	+		—	±	
Shipping fever	2-5	1-90	2-3	±50	5-25	+	—	+	—	+	+	+	±	—	—	—	—	±	—	±	—	+		±	—	
Rhino-tracheitis	14-21	5-7+	2-3	99	2-10	+	+	±	—	±	+	+	±	—	—	+	—	±	—	+	—	+	+	—	—	Sticky Stringy
Virus diarrhea	7-21	7-15	1	30-88	4-8	+	±	—	—	+	—	—	—	+	+	—	+	±	—	±	—	+		—	+	
Malignant catarrhal fever	1-30	3-12		3-10	50-90	+	+	+	±	+	+	±		±	—	—	—	—	—	±	—	+	Marked+	+	±	

*Not known in Western Hemisphere

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and trachea within 15 minutes following application of the enzyme.

Alternatively, antibiotic powder from a plastic pinch bottle may be introduced through the needle into the trachea. In some cases of dyspnea, it is necessary only to hold the nozzle of the plastic bottle into the needle hub and inhalation efforts of the animal will draw sufficient antibiotic into the trachea.

Technic of Intrathoracic Injection*

Carefully cleanse an area approximately 2 in. in diameter and two finger widths posterior to the posterior edge of the scapula and approximately midway between the upper border of the scapula and the point of the elbow at the apex of the angle formed by the scapula and humerus. This location is satisfactory for treating cattle standing in a chute.

The length of the injection needle is dependent upon the amount of finish the animal is carrying. We prefer a 14- or 15-gauge stainless steel needle, 5 in. in length, with the point reshaped to the contours of a standard spinal-type needle. The needle is inserted into an intercostal space, using a rib as a guide and is brought to rest on a lateral border of the rib. This is done without the syringe to avoid breakage or loss of intrathoracic pressure. An all-glass, 20-cc. syringe is attached to the needle with a flexible rubber coupling. A right-handed operator grasps the syringe in the right hand and applies slight pressure on the plunger. The left hand urges the needle point off the border of the rib and into the pleural cavity. As the needle point enters the cavity, the syringe plunger will move forward as a result of decrease in pressure. By steady pressure on the plunger the injection is completed.

Intrathoracic injection is a much more rapid technic than intravenous methods. For intrathoracic use of the broad spectrum antibiotics, terramycin and tetracycline, a concentration of 12.5 mg. per cc. or less is satisfactory. This is prepared by adding 80 cc. of sterile saline to 1 gm. of the antibiotic. In our experience, from 20 cc. to 40 cc. of this solution is effective in controlling chronic infectious

*Intrapleural injection of erythromycin in cases of human pulmonary infections was described by Lopez-Belio and Y. Takimura. Antibiotics Annual. 1954-55, p. 295.

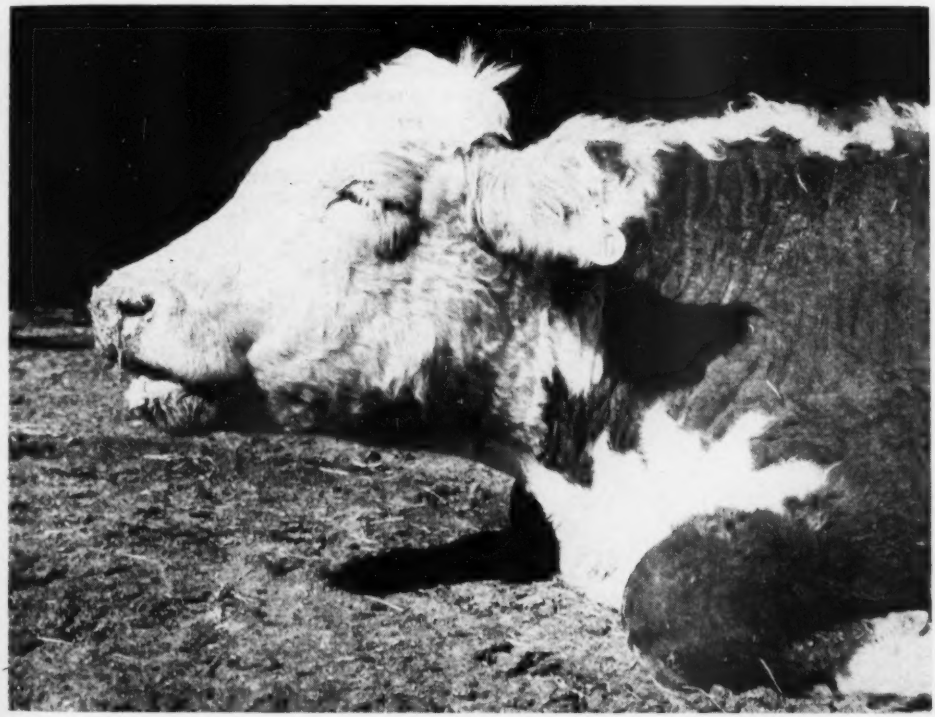

Fig. 2. Rhinotracheitis showing stringy, nasal exudate, encrustations around nose and breathing through mouth.

pneumonias. It is preferable to divide the dose and inject on both sides of the animal. Severely pneumonic animals have tolerated up to 500 cc. of fluid injected intrathoracically. In severe pneumonia animals should be treated daily for two to four days.

Results of Treatment

Two hundred sixty-five cattle treated as described were ear-tagged and allowed to intermingle with approximately 150 others in the sick pen of a large feed lot. It was obvious in making an "over the fence" appraisal that the animals given intrathoracic-intratracheal treatment were markedly improved, whereas other cattle in the group treated with other drugs or by other routes appeared to recover somewhat but would need additional treatment.

From our experience, we have developed a strict procedure in making certain that rhinotracheitis cattle are treated as described for two consecutive days. Although treated animals appear improved or even recovered from a single treatment, we have learned that relapse cases are difficult to handle and may not respond to retreatment should they relapse 96 or more hours after the initial intrathoracic injection.

Due to the insidious nature of this disease, it is clinically impossible to give a statistical evaluation of any treatment. In our experience to date, death losses in the feed lot as a whole have run about 2% of 20,000 cattle. Rhinotracheitis death losses in the sick pen may average 8 to 12% of chronic cases. Acute cases treated at onset respond favorably. About 1% of the acute cases may relapse or go on into a chronic phase lasting several weeks. Many do not die; however, the long standing chronic cases that recover usually do not develop into a marketable grade above low common. We are aware of outbreaks with 18% to 20% overall death losses, but not among herds treated by the methods described above.

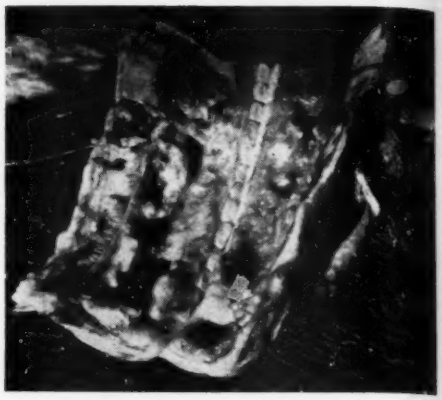

Fig. 3. Trachea from cow dead from rhinotracheitis in California. Caseous exudate is similar to that observed in some animals autopsied in Colorado.

Summary

A technic to provide high intratracheal and intrathoracic concentration of antibiotics in the treatment of anterior respiratory conditions in cattle is described together with dosage levels for certain broad-spectrum antibiotics.

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Fig. 4. Trachea from cattle with rhinotracheitis showing (left) hemorrhagic type of exudate and (right) caseous exfoliated type. Both specimens are from animals which arrived at a Colorado feed lot in the same shipment. They died within two hours of each other.

Advances Made In Swine Practice IV

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Part IV: Swine Enteritis

ENTERITIS has plagued the swine industry since 1903. Dorset, Bolton, and McBryde[1] discovered that *Bacillus cholera suis* was not the cause of hog cholera but may be responsible for the hemorrhagic intestinal inflammation, sometimes with croupous, diphtheritic changes if the disease became chronic.

In 1913, E. Wallis Hoare[2] believed that, when the *B. cholera suis* was present in the blood and tissues it was probably a secondary invader but an important accessory factor and most probably responsible for the characteristic lesions of the disease.

A. T. Kinsley,[3] described enteritis as an inflammation of the intestines which may be catarrhal, croupous, diphtheritic, mycotic (simple or infective), acute, or chronic. Acute catarrhal enteritis was a common ailment and was thought to be a result of dietary error. Diphtheritic enteritis was thought to be due to the *Bacillus necrophorus*, although some caustic chemical may account for some of the cases found in those days.

One of the early writers on swine enteritis was E. A. Cahill[4]. He concluded that button ulcers, congestion of the intestinal tract and necrosis were not diagnostic of cholera but may be found in cholera-sick or cholera-free swine. It was his conclusion that necrotic enteritis may be caused by any of the intestinal group of organisms. In the normal individual, these intestinal organisms ordinarily are unable to cause disease on account of the normal and well balanced tolerance between the host and the organisms, but, when resistance becomes lowered from any cause, these organisms constitute an overload and become capable of causing pathological changes, at which time necrotic enteritis develops. Cahill recommended sulfocarbolates or copper sulphate as treatment along with soft, well balanced feed ration.

The Purdue Experimental Station reported[5] that they could reproduce cecitis and colitis by feeding large intestines or bowel content from naturally-affected hogs.

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Readers are referred to previous installments of Advances Made in Swine Practice appearing in past issues of VETERINARY MEDICINE: Part I, November, 1955, p. 565: Part II, December 1955, p. 683: and Part III, January 1956, p. 33.

Swine diseases have presented perplexing problems to practitioners and researchers alike for many years. Among the most important is that group of diseases simply referred to as swine enteritis. It is known that many factors, both intrinsic and extrinsic, influence morbidity, that manifestations vary according to specific cause and environment influences, and that character of the affectations is undergoing constant change. Many recommendations have been proposed for treatment; none is a panacea.

Practitioners are urged to apply those agents which experience has proved useful until such time as more knowledge is accumulated and specific therapeutic agents are discovered.

Varied Causes

In 1922, A. T. Kinsley[6] was of the opinion that intestinal parasites injure the intestinal mucosa and are, therefore, a factor in infection. The sanitary conditions in which the swine are maintained have an influence upon the susceptibility. As a treatment, it was suggested that solid food and tankage be removed from the diet. Semisolid buttermilk was considered to be one of the best treatments because it contained lactic acid which had a tendency to diminish or prevent activity of the bacteria of the colon-typhoid group. The use of mixed bacterins also was recommended.

Murray *et al.*[7], concluded that the primary cause of infectious enteritis in swine was due to the *Bacterium suipestifer*. They described the gross and microscopic pathology in detail. *Balantidium coli* and *Trichomonas suis* were not found in more than 50% of the subjects studied. Feeding of cultures of *B. suipestifer* reproduced necrotic enteritis. The study indicated that the suipestifer type organism acts as the primary etiological agent, producing an injury with subsequent exudation and necrosis of the epithelium of the mucosa and underlying tissues. *Actinomyces necrophorus* appeared consistently as a secondary invader.

Again in 1930, A. T. Kinsley[8] suggested that the losses sustained in stock hogs from public markets immunized against hog cholera might

be due to necrotic enteritis. The use of bacterins and easily digestible alkalinized slop foods were recommended for treatment.

Charles Murray, *et al.*[9,10,11,12,13,14] were the pioneers in the United States as far as research in swine enteritis is concerned. Their research has stood the test of time. Although it never has been duplicated, results have not been questioned.

In 1933,[15] workers in Michigan reported that striking recovery occurred when raw liver had been fed to swine affected with enteritis. Barley also had a preventive and curative effect.

Infections and Nutritional Enteritis

Heavy losses[16] occurred in three to five-day-old pigs in 1933 on a large number of garbage feeding establishments. The disease was an acute enteritis characterized by diarrhea and extreme weakness. Postmortem lesions consisted of severe inflammation of the small intestines. Bacteriological studies indicated that *E. coli* was the cause. There is a possibility that what is now known as infectious gastroenteritis of three-day-old pigs may have been the trouble in the pigs on these establishments.

H. E. Biester, L. H. Schwarte and S. H. McNutt[17], described a condition known as acute hemorrhagic enteritis which occurred in swine following cattle. The cause was unknown. It usually affected heavy weight swine in good condition. Death may be rapid.

C. C. Hastings[18], reporting on pig scours, suggested that a large percentage of deaths in small pigs was due to scours. His opinion was that overfeeding of the sow was responsible for the scouring in the baby pigs.

In 1939, L. A. Gray[19] stated that all types of enteritis were on the increase and that much of the economic loss resulted from the failure of the affected animals to make proper gains from the feed consumed and from an increased susceptibility to certain infections and parasitisms. He differentiated between infectious necrotic enteritis, scours of baby pigs, coccidiosis or bloody diarrhea, spirochetosis or black scours, swine dysentery, nodular disease, and vitamin A deficiency.

John B. Bryant[20], had experienced swine enteritis in his practice. It was a serious menace to hog cholera vaccination due to severe reactions in some herds harboring the disease. He gave as some of the reasons for incidence such things as increased numbers of swine being raised on too small pastures or under crowded conditions which tended to produce a concentration of bacterial infections. He advocated that the old central hog house and grounds be discarded for individual hog houses on clean ground.

By 1939, L. P. Doyle[21] stated that it then was obvious that hog cholera was not the only disease which may cause serious losses to the swine industry. The differentiation between the effect of this virus disease on the intestinal tract and other forms of infectious enteritis was by no means an easy task. It then appeared advisable to regard necrosis of the intestinal tissues as the possible effect of any one of several different causes.

J. S. Koen[22] reported on a condition in swine on farms in northwest Iowa which he described as colitis or gastrocolitis. It appeared in all ages of swine as a bloody discharge from the cecum, colon, and rectum. Frequently masses of clotted blood were found in the rectum. Feed was not considered a factor. Heavy hogs were found dead. No treatment then was suggested.

A common condition to be observed on many farms. Pigs root in the wallow for food. Lack of sanitation results in diseases of many kinds, foremost of which are enteric disturbances.

F. M. Wilson[23] stated that only within the past 25 years have swine diseases been differentiated and, to a limited extent, classified. He classified the enteritis syndrome as follows: Enteritis of sucklings (white scours) due to colon-typhoid group; necrotic enteritis due to *Salmonella suipestifer;* enteritis due to coccidia; bloody scours due to unknown factors; enteritis due to chemicals; and secondary enteritis due to specific swine diseases such as hog cholera and erysipelas. The principal handicaps to control, regardless of cause, were the poor sanitary conditions on some farms.

An extensive experiment by Davis *et al.*[24], covering a period of three years, indicated that necrotic enteritis of swine develops primarily as a result of nutritional deficiency. More pigs became affected with the disease when fed a basal ration of yellow corn than a barley ration. Liver, yeast, and nicotinic acid were fed with remarkable results—both as a cure and as a preventive of necrotic enteritis.

L. P. Doyle[25], in 1940, conceded the possibility of nutritional factors, particularly in young swine. Caution however, must be exercised to avoid blaming feed for what may be due to specific infection.

Before 1940,[26] it was stated that necrotic enteritis was a disease so widespread among swine that it was probably second only to hog cholera as a cause of swine mortality. It was considered to be a disease of filth, but it had been found frequently among swine kept under the best sanitary conditions. Nicotinic acid was being offered to the profession as an aid in the control of enteritis. Its use was somewhat limited due to the cost of material.

According to B. W. Fairbanks and Elizabeth Curzon[27], necrotic enteritis, or an identical syndrome, appeared frequently in swine on a ration low in, or devoid of, nicotinic acid. Sixty to 100 mg. of nicotinic acid per pig daily, or one to two ounces of yeast per pig per day, fed as a supplement to the diet, apparently protected the pigs against the appearance of lesions. Many mineral and feed companies began adding yeast to their products. Among those to put nicotinic acid into practical use was C. C. Hastings[27a] who used it in the same recommended dosage. He concluded that it was the best treatment used to that time.

Treatments Recommended

Many treatments for enteritis have been suggested. Among them was one by R. W. Hixson[28], who advocated the use of stale bread because it is easily digested.

In 1941[29], bloody scours were being treated by the so-called salt treatment. It consisted of one gallon measure of salt to 50 gallons of buttermilk. The herd was placed on the treatment for three days, then removed three days, with plenty of fresh water available at all times. This appeared to be a satisfactory treatment for bloody dysentery. Many veterinarians were slow to adapt the method for fear of salt poisoning. The treatment did gain favor and has lasted up to the present time, although other treatments also have appeared.

By 1941, the BAI[30] had confirmed the work in part done by Murray, *et al,* on the etiological agent of swine enteritis. Tests showed that broth cultures of the pathogenic form of *Sal. cholerasuis,* when fed to apparently healthy swine, produced necrotic enteritis. Necrotic enteritis also developed in swine placed in contact with those which were fed broth cultures.

A. Eichhorn[31], reported on the study of swine enteritis in Great Britain. The work established the fact that the disease can be set

Necrotic enteritis. Pathology noted on gross examinations of lesions may be due to a variety of causes. These include infectious agents, parasites, chemicals, and nutritional factors. Necrotic enteritis usually is manifested by necrosis of areas of mucosa of the large intestine.

up artificially by quite small doses of *B. suipestifer* in pigs on diets that appear to be adequate in every way. Sulfonamide preparations had no favorable effect on the course of the disease.

Frank Breed[23] emphasized the fact that the digestive tract of swine of all ages is constantly subject to pathological disturbance resulting from widely divergent causes; many of which tend to break down tissue structure.

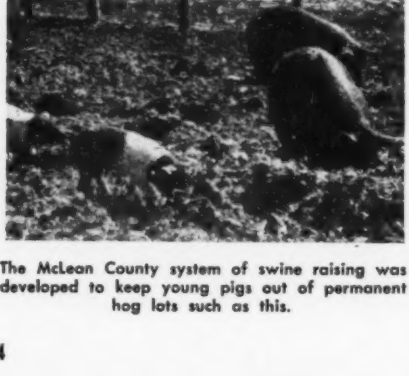
E. V. Hoover[23] recommended the use of bacterins and hog cholera antiserum in the control of acute enteritis.

By 1942[24], the sulfonamides had made the rounds in the field of veterinary medicine. The use of sulfaguanidine, at the rate of 1 gm. per each 20 lb. of body weight four times a day and continued for several days after apparent recovery, was recommended.

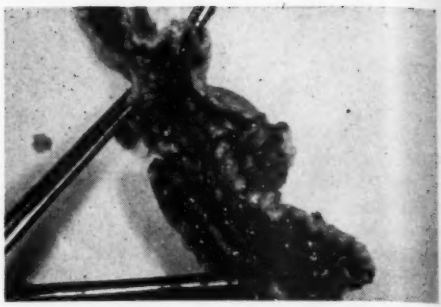
B. H. Edgington, *et al.*[25], concluded that the protective value of nicotinic acid against *Sal. cholerasius* infection was not sufficient to encourage its use as a specific preventive or curative measure for this type of bacterial infection in swine.

H. S. Cameron[26] expressed an opinion that access to an unlimited amount of feed, with the result of overeating, plays an important part in the etiology, particularly in weaner pigs. He gave sulfaguandine in gelatin capsules. The dose was 1 gm. per 20 lb. of body weight for three days. Treatment was continued until definite improvement occurred.

H. C. H. Kernkamp, and M. H. Roepke[27,28] did some experimental work with sulfaguanidine under field conditions. They concluded that the diarrhea was checked and feces returned to normal consistency by the fourth or fifth day, but the drug was administered for an additional four days. Unless good sanitary and management practices are followed in connection with drug treatment, reinfection may occur.



The McLean County system of swine raising was developed to keep young pigs out of permanent hog lots such as this.



Swine small intestines; a typical case of mycotic enteritis which involves only the small intestines. Usually this type of lesion does not extend into the colon or cecum. It may appear only as a strip or it may involve the entire lumen of the bowel.

Claire E. Treman[29] advocated close confinement of affected swine, preferably on concrete floors; also, that feed be withheld and sodium bicarbonate added to the drinking water for one day, after which the salt treatment was given. This consisted of feeding oats soaked in a solution of 1 lb. of salt to 5 gal. of water the following day. Buttermilk with salt added also was recommended.

G. K. Davis, *et al.*[40], concluded from their experimental work that sulfaguanidine was effective in protecting pigs from the *Sal. cholerasuis* infection. However, an analysis of the weight gains made during the experiment, indicated that, although the drug was valuable as a bacteriostatic, it did not enable the pigs to overcome the deficiency in the ration which produced the pellagra-like syndrome.

J. S. Koen[41] was the first in Iowa to recommend the salt treatment for hemorrhagic dysentery. The modified procedure was as follows: Add 1 lb. of salt to 5 gal. of water and soak ½ to 2/3 bushels of oats for 12 hours. At feeding time, add 1/3 pint of alkaline mixture solution and mix well. At noon each day, add 1 lb. of salt to each 5 gal. of buttermilk and allow the herd all the buttermilk they will drink. Treat for five days, remove from treatment three days, then return to treatment for five days. Allow plenty of fresh water at all times.

F. M. Wilson[42] emphasized the importance of strict isolation for a period of at least three weeks of newly purchased feeder pigs for fear of introducing enteritis onto farms.

At the Iowa State meeting in 1943, John Shoeman[43] suggested the use of 4 oz. of sodium hypochloride to 5 gal. of slop as a treatment for enteritis.

Among the many treatments recommended by A. H. Quin[44], he suggested that feeding troughs be scrubbed daily with hot lye water; that the drinking fountains be chlorinated, and that the animals be kept on concrete feeding floors, if possible, so that the floors could be cleansed daily.

The 1943 Report of the Chief of the BAI[45] indicated that swine vaccinated with *Sal. suipestifer* bacterin were well protected when fed virulent cultures of the organisms.

Many veterinarians began using bacterins in droves of swine scheduled for vaccination later for hog cholera and on farms where swine herds had previously exhibited unfavorable reaction to the simultaneous treatment. This procedure was tried with some degree of success, particularly if the swine were given at least two doses of the bacterin at from seven to ten days intervals and at least a week before hog cholera immunization. It should be stated that the method was entirely satisfactory, but that farmers did not like to handle animals so many times. For that reason, the practice was not continued.

T. L. Steenerson[46] advocated that corn should be eliminated from the diet of any hog with any type of intestinal disturbance. Wheat, oats, and supplement, plus range and pasture in season, had given much better results than anything else that could be fed with the exception of milk products. He suggested that all grains be fed in slop form.

Sam Elmer[47] was of the opinion that one of the primary causes of enteritis in swine is the feeding of concentrated feed too early in the lives of the pigs. Farmers were feeding all that the pigs wanted to eat. The use of tankage in swine feed was necessary.

J. H. Krichel[48] recommended a dose of oil of chenopodium as a treatment of enteritis due to *Balantidium coli*.

Louis Morin[49] believed that prenatal infection and infection early in the life of the baby pig was the forerunner in most cases of enteritis.

Roy M. Morton[50] thought that grass was not easily handled by young pigs because most of his cases of enteritis occurred during the grass growing season. Very few cases occurred during the fall and winter when the pigs were on the all grain diet.

L. A. Tishhouser[51] used salts of iron, copper, and magnesium, charcoal, and sodium chloride in his treatment.

By 1944[52] the sulfonamide drugs were being used extensively. The efficacy of some for the treatment of enteritis in its advanced stages was particularly striking. Therefore, the niacin and sulfonamide combination appeared to offer the best therapy. Feed stuffs were being fortified with most of the known vitamins.

The Report of the Chief of the BAI[53], 1944, states that dried distillers grains may be of benefit to swine because it contains high protein content and generous levels of vitamins of the B complex.

By 1944, R. A. Rasmussen *et al.*[54] produced necrotic enteritis in swine by giving cultures of *Sal. cholerasius*. A more severe reaction was secured when the culture was mixed in the feed than when given as a drench. Some factor found in liver meal was responsible for some rapid recoveries of the animals. Yeast did not give satisfactory results.

H. C. Smith[55] suggested the use of tankage and more animal fats for the treatment of nutritional enteritis. Liver meal had been particularly beneficial.

R. Graham, *et al.*[56], demonstrated the value of sulfathalidine given in the feed in cases of enteritis. This particular drug was used quite extensively during that period.

H. C. H. Kernkamp[57] described many causes of these diseases as they occur. Gastrointestinal disturbances occurred in different forms and types and from different causes. Some were quite simple and readily understandable, while others were complex and unsolved. Some of the ailments occurred more commonly in pigs within rather definite age limits, whereas others occurred at almost any time of life. Hog raisers were sometimes dissatisfied with the services they received from their veterinarians when, as a matter of fact, the fault was in their failure to carry out the procedures specified in the treatment prescribed.

In cases of salmonellosis, J. D. Ray[58] recommended the use of bacterins and replacement of fluids lost through diarrhea.

In addition to the "salt" treatment, D. M. Campbell[59] suggested that one pint of iron oxide be added to the mixture. Trials at the Wisconsin Agricultural Experimental Station indicated that the salt treatment was more harmful than beneficial as a remedy for enteritis because pigs did not gain in weight as much as the controls.

L. P. Doyle[60] stated that one of the unfortunate trends which had developed during the past several years was to disregard hog cholera as a cause of enteritis. Vaccination of pigs at

an earlier age than usual appeared to have considerable merit in solving the enteritis problem on some farms.

Hemorrhagic dysentery was described in October 1921 in Purdue University Bulletin no. 257.

The Report of the Chief of the BAI[61], 1945, stated that young pigs receiving a purified diet devoid of nicotinic acid but containing 25% protein and otherwise adequate, manifested deficiency symptoms consisting of impaired appetite, diarrhea, and retarded growth; and, at autopsy, frequently revealed necrotic lesions of the large intestines.

E. V. Edmonds[62] recommended sulfathalidine as treatment for the enteritis complex in suckling and feeder pigs and in mature hogs. Single daily doses for four to six days appeared to have been sufficient to overcome the infection. The dose was from 0.25 to 2.0 gm. for suckling pigs; for feeder pigs, 0.5 to 1.3 gm. per 10 lb. of body weight, and for mature swine, 0.2 gm. per 10 lb. of body weight.

Geo. A. Hawthorne[63] selected sodium sulfathiazole as the treatment of enteritis because it is readily soluble and can be administered either in the drinking water or slop. The recommended dosage was 1 lb. in 1 gal. of water, then 1 pt. in 25 gal. of water the first day, then 1 pt. in 50 gal. of water for four more days. There had been no evidence of toxicity when this amount was given.

Transmissible Gastroenteritis

For a number of years, a transmissible gastronteritis of pigs had plagued the profession because the cause had not been determined and treatment applied was ineffective.

In 1946, L. P. Doyle and L. M. Hutchings[64] found that oral administration of filtrate of triturated gastrointestinal tract of infected pigs was followed by gastroenteritis in baby pigs. Older swine might become affected but to a lesser degree than baby pigs.

E. V. Edmonds[65] reported that single, daily doses of 0.25 gm. or 0.5 gm. of sulfathalidine appeared adequate to overcome most cases of the infection among suckling pigs.

In 1946, L. P. Doyle and F. L. Walkey[66], following some experimental work, concluded that cholera is a far more important cause of enteritis than is recognized generally.

L. M. Hutchings[67] reported that infectious gastroenteritis was on the increase. Their experiments indicated that it was difficult to arrange for control animals, since, if there was one affected pig in a farrowing house, all acquired the disease—no matter how strict the isolation. Practically all of the pigs contracting the disease, when they were under ten days of age, died; over that age, the deaths were not so numerous. The infectious agent did not survive on the premises from one farrowing season to the next.

C. K. Whitechair, *et al.*,[68] did considerable work with gastroenteritis of pigs. They reported that pathogenic organisms which were in any way associated with the disease could not be isolated. Hog cholera virus was found not to be involved nor was any toxic material in the sow's milk.

The Chief of the BAI[69] reported that lyophilized cultures of *Sal. cholerasuis* retained their virulence for ten years.

Hemorrhagic Dysentery

L. P. Doyle[70] suggested *Vibrio coli* as the cause of hemorrhagic dysentery.

S. H. McNutt and Paulo Dacorso[71] stated that the death losses of small pigs constituted the major problems in swine raising. Swine losses associated with enteritis and diarrhea apparently surpassed all others. They listed two major groups of enteritis—those due to infections and those due to deficiencies. They classified as infectious those associated with hog cholera and erysipelas, necrotic enteritis due to *Sal. cholerasius*, swine dysentery due to *V. coli*, coccidiosis, transmissible gastroenteritis, and a virus enteritis. The deficiencies listed included those of the B complex, vitamin A, and some water soluble substances found in the liver.

R. M. Hofferd[72] preferred to move the good portion of the drove to an alfalfa or clover field. The sick ones also should be moved, but separated from the healthy pigs.

E. V. Edmonds[73] reported that sulfathalidine and sulfamerazine were of definite value in the treatment of enteritis-pneumonia syndromes in swine. Sodium sulfamerazine was injected intraperitoneally or subcutaneously, and the acid forms of sulfamerazine and sulfathalidine were given orally as tablets or in alkalized drinking water. No evidence of toxicity developed.

The Report of the Chief of the BAI[74], 1949, reported that, for the last four years, infectious gastroenteritis had occurred quite frequently in swine herds. The most striking symptoms were diarrhea (often with a peculiar odor), rapid loss of weight, vomiting, and death in a few

days. The disease was transmitted with a bacteria-free filtrate prepared from intestines of infected pigs. Severe losses had occurred from time to time in certain communities. The death rate was heavy in pigs under ten days of age. No effective treatment had been established up to that time.

R. W. Luecke, *et al.*[76] observed considerable enteritis on high corn diets and comparatively little on rations containing barley. They showed that intraperitoneal injections of a combination of vitamins consisting of thiamine, riboflavin, calcium pantothenate, niacin, and pyredorine was of benefit to pigs affected with nutritional enteritis.

Bacitracin[74], one of the newer antibiotics, came into use in swine practice. Daily doses of 100,000 units given in the feed resulted in recession of symptoms but unthriftiness continued.

In 1950, R. H. Walker and E. V. Edmonds[77] demonstrated the value of injectable sulfonamides in the treatment of the pneumonia-enteritis complex. Their work applied to sulfamerazine and sulfamethazine.

Veterinarians[78] began using the injectable vitamins shortly after their introduction. The results were satisfactory and were a great help in overcoming the debilitating disease.

In 1951[79], it became evident that most of the enteric conditions of swine might be of both nutritional and infectious origin. It, therefore, was necessary to treat the sick pigs with some type of medication in the drinking water and to supply them with proper proteins, vitamins, and minerals as quickly as possible. Sulfaquinoxaline was used in the drinking water at the rate of 1½ oz. per gallon of water. The feed was supplemented with meat scraps, vitamin and mineral preparations.

L. E. Boley, *et al.*[80], did considerable work with sulfathalidine, sulfamethazine, sodium arsanilate and bacitracin. In one herd of swine, *Vibrio coli* was considered to be the cause of the enteritis; however, lyophilized cultures did not reproduce the disease.

In 1952[81], a new type of agent intended for the control of enteritis was introduced. The product, nitrofurazone (5 nitro, 2 furaldehyde semicarbazone), was being tested. The dose recommended was 0.25 to 0.3 gm., given morning and evening. Some animals may require additional medication in the feed.

In 1952[82], the report of the Committee on Transmissible Diseases of Swine, stated that the enteritis complex continued to be an important problem in swine production. During that year there was less trouble than previously reported. The problem of relapses where *Vibrio colon* infection prevailed continued to be a factor following whatever treatment is used.

The writer's experience indicates that, when the arsenical compounds are used, it may be necessary to maintain the herd on the medication for a longer period than is usually recommended. We know of several herds that were treated for as long as 45 days.

For the treatment if vibrionic enteritis, H. C. H. Kernkamp[83] recommended the use of sodium arsanilate in the drinking water at the rate of 10 gr. per gallon of water for five to six days.

E. E. Terry[84] recommended the use of sulfathalidine and sodium arsanilate as a safe, effective, and practical treatment for the control of enteric diseases. Many veterinarians today are using this combination, while others are substituting other sulfanomides such as sodium sulfathiazole.

Bacitracin[85] was used primarily to prevent

Hemorrhagic gastrocolitis. Such lesions of the large intestine as illustrated are cause of symptoms referred to as bloody scours. Lesions in this type of enteritis involve primarily the large colon though may extend, in advanced cases, throughout the digestive tract.

the stunting and control of clinical outbreaks after the initial control by arsanilates. Growth stimulation, greater activity and a marked increase in feed consumption usually were apparent within three days after institution of treatment.

Nils Lannek of Sweden[86], 1954, using nitrofurazone on an infected farm herd of swine, reported that the agent may decrease the appetite and thereby reduce the food intake and retard the growth rate, although this was not observed when the pigs had spent two weeks in the infected herd before treatment was started. He used the agent in the feed as a preventive.

The 1954 report of the Committee on Transmissible Diseases of Swine[87] stated that the widespread use of antibiotics in feed, no doubt, had influenced favorably the enteric disease problem. *Vibrio colon* infection continued to be a problem in many areas, and it did not appear to be controlled as easily as some of the other infections. Relapses were common following treatment of this infection.

Walter Hawk[88] reported on the use of the broad spectrum antibiotics in the feed; namely, aureomycin®[1] and terramycin®[2], at the rate of 200 to 300 gm. per ton of feed. This amount failed to prevent new cases. He recommended treatment of individual animals, but suggested that larger doses of antibiotics given in the drinking water may be beneficial.

Because there are so many types and kinds of enteric conditions in swine, it has been rather difficult for practicing veterinarians to make an accurate diagnosis in the field, with possibly two exceptions—those being the enteritis that may accompany hog cholera and erysipelas. The Salmonella and *Vibrio colon* may be isolated in the laboratory; therefore, the causative agent can be identified properly. Other conditions producing diarrhea have taxed ingenuity of practitioners.

We have come a long way in our methods of treating various enteric conditions; from copper sulphate and iron preparations, down through the use of all of the now known alkaline mixtures and electrolytic replacements, to all of the sulfonamides as they were developed, to the antibiotics, arsenicals and combinations of all of them. Even now treatment of the enteric complex of swine needs further study for differentiating etiological agents and for improved medicinals that may have dependable efficacy.

®[1]Lederle Laboratories Division, Pearl River, N.Y.
®[2]Chas. Pfizer & Co., Brooklyn, N.Y.

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(References continued on page 96)

EDITORIAL COMMENTS

First Results of Foot-and-Mouth Disease Research in the United States

Scientists of the U.S. Department of Agriculture's Animal Disease Laboratory on Plum Island, N.Y., report success in growing virus of foot-and-mouth disease in cultures of swine or bovine kidney cells.

This accomplishment, by Drs. H. L. Bachrach, W. R. Hess, and J. J. Callis of the laboratory staff, opens the door to use of practical tissue-culture technics in: (1) Diagnosis of the disease and identification of the type of virus present, (2) determination of concentrations of the viruses and antibodies produced in animals, and (3) large-scale production of the virus for fundamental studies and vaccine investigations.

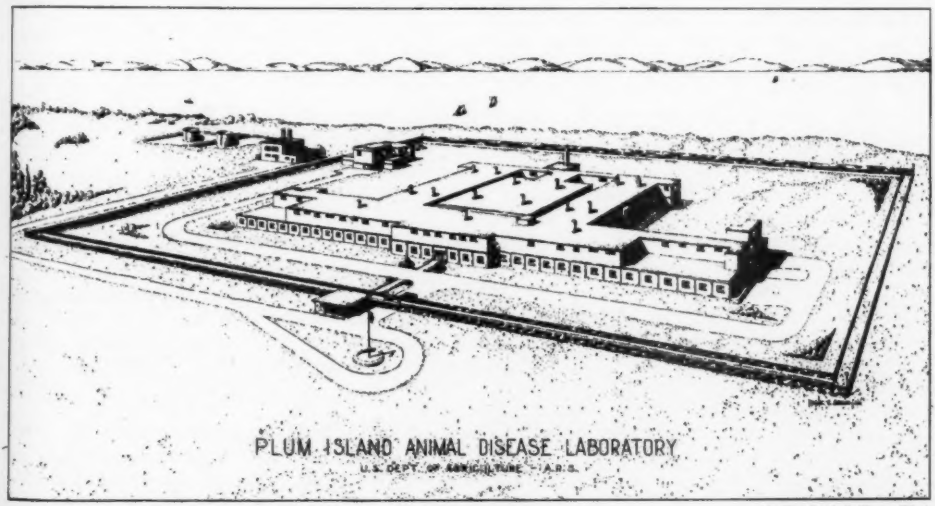
Foot-and-mouth disease virus has been grown experimentally in other types of cultures by investigators in the Netherlands, but their methods were not adapted to the measurement of virus and antibody concentrations. The method developed at Plum Island, which also has been independently achieved at a research laboratory in England, permits the rapid enumeration of viruses and antibodies. This work is also the first in which kidney cells from hogs and cattle have been used for routine production of virus in the quantities needed for research purposes. The method is similar to that employed in growing poliomyelitis virus for the manufacture of vaccine.

In developing a method for production of foot-and-mouth disease virus in kidney-cell culture, researchers Bachrach, Hess, and Callis used the type A virus, one of six recognized types of virus causing this disease. First step in the method is preparation of a suspension of bovine or swine kidney cells in a nutrient solution containing salts, bovine serum, products derived from such serum, and antibiotics.

Test tubes or flasks containing the cell suspensions are placed in an incubator, where the cells attach themselves to the inside surfaces of their containers and then multiply for several days. Then each culture is inoculated with virus, which immediately begins to reproduce itself in the kidney-cell medium. The kidneys from one calf supply enough cells to prepare about 50,000 cultures in test tubes, or more than 300 cultures in the quart-sized flasks for large-scale virus production.

The Plum Island scientists forsee application of present successful experiments as a major forward step toward eventual control of the disease. The new method will allow research to proceed at an accelerated rate and at a lower cost than was formerly possible.

Announcement of this development of the Plum Island Laboratory is the first report of



Authenticated News Photo

research conducted inside the United States on foot-and-mouth disease. Before establishment of this laboratory, located off Orient Point at the eastern end of Long Island, no research on foot-and-mouth disease virus was permitted in this country.

▾ ▾ ▾

Health Products

Apace with research in medical science, pharmaceutical development has undergone changes the magnitude of which is reflected in total sales at the manufacturers' level, reported by *Industrial Bulletin of Arthur D. Little, Inc.*, November 1955. Sales in 1939 were $301,000,000., and have risen to an estimated volume for 1954 of $1,560,000,000., a five-fold increase in 15 years. Production of medicinal chemicals nearly doubled in the five-year period immediately following World War II, 1946-1951. Further expansion is anticipated, according to industry sources, which predict that by 1960 the nation's pharmacies will fill 554,000,000 prescriptions, approximately 25% more than for 1954.

The past half century of medical progress can not be compared with any previous period. Changes in management of patients and use of chemotherapeutic agents in retrospect is phenomenal. Over two-thirds of the drugs in common use today were unknown a brief ten years ago. This spectacular development contrasts sharply with the situation in 1900 when it was considered progressive if one valuable medicinal agent was discovered in 25 years. About 95 new pharmaceutical specialties were introduced in 1940, and approximately 550 in 1954. Duplications exist among these while many represent alert applications of accelerated research, which has made new and potent remedies available. Pharmaceutical research cost $181,000,000. in 1953—ten times the amount spent in 1941.

Benefits to mankind have been manifold. Life expectancy figures reflect rapid advances in the field of medicine. Whereas an infant born in 1940 had a life expectancy of 63.6 years, by 1950 the figure had advanced to 68 years, and the trend is continuing upward. In addition to living longer, medical science has made possible living in better health during advanced years. While greatest progress is apparent in control of the ravages of infectious diseases, degenerative conditions have not been overlooked. Increased interest in geriatrics can be expected to lengthen still further the productive life of man.

Veterinary medicine has not only contributed to this advance but in some instances paced it. Antibiotics, first popularized in the realm of human diseases have been shown to have other uses including their growth-stimulating influence in animals. Research on virus diseases of animals contributed to the final perfection of Salk poliomyelitis vaccine and the understanding of the problems posed by virus diseases. In many other instances health potentials of new agents have been demonstrated by wide use on domestic animals, and thereby have strengthened confidences for their value in human medicine.

Research is being stimulated continuously by needs to the extent that the next decade may be expected to be characterized by equally fruitful results of technology and science from which mankind is certain to benefit.

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Slight Decrease in Spring Pig Crop Forecast

The USDA reported recently that the spring pig crop is now expected to be down only 2% from last spring. This prediction is based on growers' intentions estimated as of December 1, 1955.

The small reduction is expected to keep market hog prices depressed during coming months. No consideration is given other factors responsible for the lowest prices paid farmers since prewar years.

Pork consumption is down for a variety of reasons. They include:

1. Publicity given fat content and efforts of many to avoid fatty foods; either for reducing weight or for other reasons.
2. Poor quality of cured meats.
3. Lack of good promotion activities.
4. Exorbitant prices for cuts as compared to live cost.
5. Low prices and few markets for animal fats.
6. Wide publicity given disease outbreaks.

Pork is nutritious food. It is also tasty when properly prepared. Hogs are well adapated to diversified American agriculture. Pork deserves the best in promotion activities of all interested agencies and it is not getting it.

▾ ▾ ▾

Death rate in the United States for 1955 will be 9.2 per 1,000 approximately that of 1954, the lowest of record, according to Metropolitan Life Insurance Company statisticians.

Quebec School of Veterinary Medicine

Regrettably, mention of the Ecole De Médicine Vétérinaire De La Province De Quebec, Affiliée a L'Université De Montréal, Saint-Hyacinthe, Québec (School of Veterinary Medicine of the Province of Quebec, Affiliated with the University of Montreal) was not made, nor was the picture of the director included with those of the Deans of other schools in the United States and Canada in the Anniversary Issue of VETERINARY MEDICINE (Nov. 1955). In this we hasten to correct the unintentional oversight.

Dr. Gustave Labelle

The Quebec School is a normal continuation of the Veterinary School of Montreal founded in 1886. Various changes in name, affiliation, and location took place subsequently, and in 1947 it was moved to its present location. Earlier connections of a veterinary school to serve French-speaking people in Quebec also have contributed to the present institution. These dating to 1866, or shortly after the establishment of the Ontario Veterinary College founded in Toronto in 1862 by Andrew Smith, M.R.C.V.S.

Both the Quebec and Ontario schools offer a five-year course leading to a professional degree instead of requiring two years of professional collegiate credit as required by all veterinary colleges in the United States. Total enrollment at the Quebec school for the current academic year is 117 undergraduate students (five classes). The institution is recognized by the A.V.M.A. Dr. Gustave Labelle is directeur and Dr. Jacques Saint-Georges, the secretary.

▾ ▾ ▾

Cobalt Deficiency

Study conducted by the United States Plant, Soil, and Nutrition Laboratory at Cornell University, Ithaca, New York, reveals that the soil of large areas of New York state is cobalt deficient.

Deficiency of this mineral, necessary in trace amounts for synthesis of vitamin B_{12} by ruminants, has significant influence on health and milk production of dairy animals. As a result of studies, almost all commercial feeds sold in New York are "spiked" with cobalt, according to *Hoard's Dairyman*. It is claimed that New York dairymen are saving about $480,000. a year in increased milk production alone by additions of minute amounts of cobalt salts.

▾ ▾ ▾

California Crop and Livestock Reporting Service reports indicate that over 50,000,000 commercial broilers and fryers, excluding chicks of the light breeds, were produced in that state in 1954, and almost 10,000,000 turkeys. In the same report the estimate of dressed poultry received in California from 23 other states exceeds 20,000,000 lb.

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Some promise of lessening of severity of attack of infectious hepatitis in man exists in the early use of gamma globulin.

New Basic Science Building of the School of Veterinary Medicine of the Province of Quebec, Saint-Hyacinthe.

PRINCIPLES OF ANIMAL HEALTH

R. R. DYKSTRA, D.V.M.
Manhattan, Kansas

Selection of a Boar

We had an inquiry a few days ago from a swine breeder in which he stated, "I am contemplating the purchase of a boar but the owner wants an unusually high price for him because the animal is 14-teated. It is contended that this makes him a more than ordinarily valuable sire. Is this contention an established one?"

A boar having extra teats would transmit this characteristic to his offspring in the same manner that a sow influences mammary development and activity. However, we have no information that the litters also would be large, nor that there is more milk production in a 14-teated animal than in a 12-teated one. Usually it is found that 14 teats in the mammary region crowd the area so badly that the mammae are undersized. If a sow can raise 12 healthy pigs because of an adequate supply of nourishment, it is certainly better than to have 14 undernourished runts. Probably of greater importance than the number of teats is whether or not the teats of either the sire or dam are inverted because this is a genetically transmissable factor from either male or female, and a sow so affected can not nurse her young.

▾ ▾ ▾

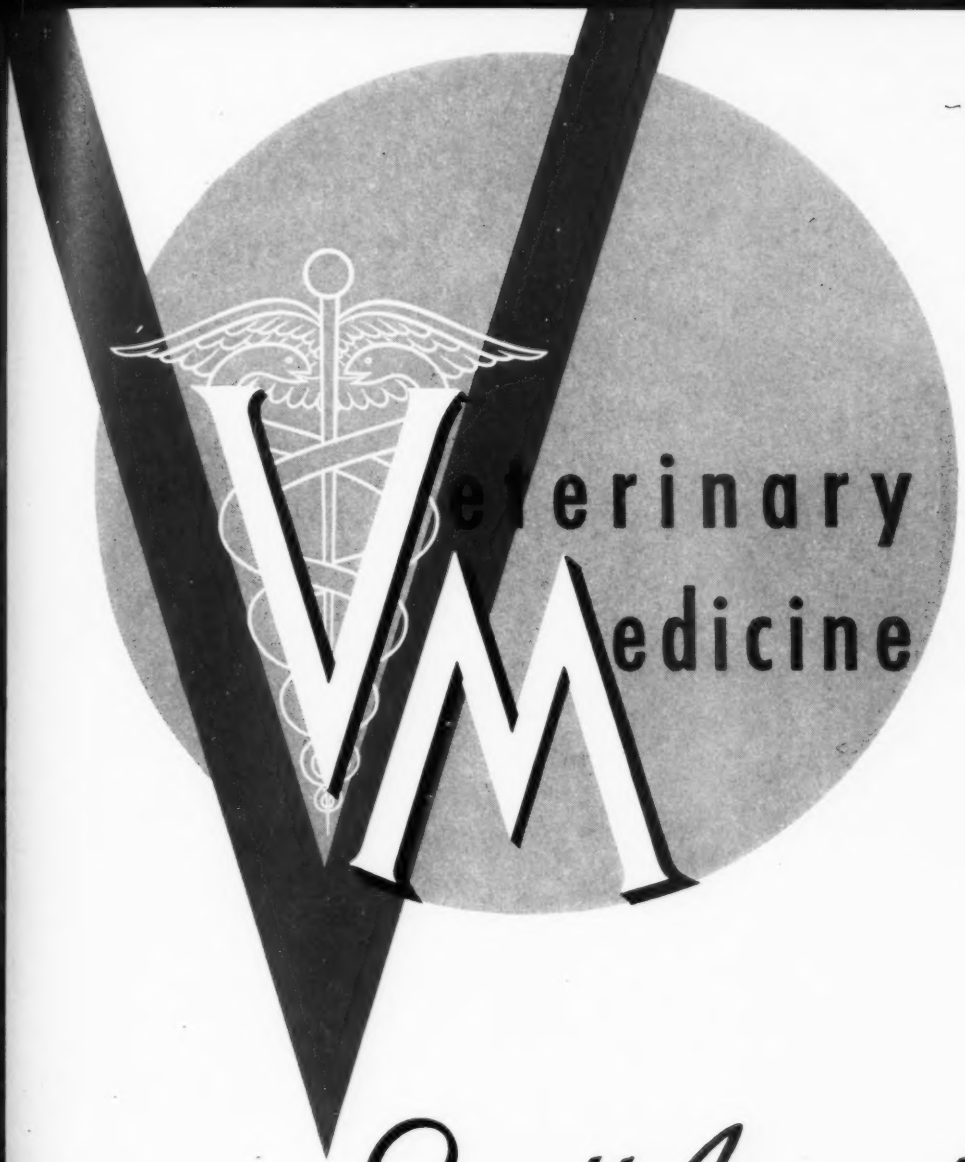
Traumatic Reticulitis

Some of the old-time practitioners contend that many cases of bovine traumatic pericarditis may be relieved, frequently cured, if at the first clinical signs of the ailment the animal is placed in a single stall having an inclined floor. The front of the floor resting against the feed manger is raised by placing under it a 2″ x 6″ set edgewise. The rear end of the floor terminates ten inches in front of the gutter, and to prevent sagging, a 2″ x 4″ is placed on edge, crosswise, about midway between the front and rear. The flooring is made of ½ inch boards. Keep the cow in the stall continuously for three weeks. During this period gravity pulls the reticulum away from the pericardial sac so that the injury heals, except when there is already established a purulent pericarditis. These latter cases always terminate fatally. During the wound-healing process the sharppointed foreign body loses its needle sharpness because of erosion, or peristalsis may place it in a different position so that it is much less likely to result again in traumatism.

▾ ▾ ▾

Porcine Hemolytic Anemia

In the *British Veterinary Journal* for November 1955, Buxton, Brooksbank and Coombs record, somewhat in detail, their observations of an outbreak of hemolytic anemia of pigs. American veterinarians are probably more familiar with hemolytic anemia and icterus as observed in Kentucky in Thoroughbred colts. The nature of the condition in colts and pigs is similar. It is due to serological incompatibility in the mating of certain sires and dams. The dam carries an antibody because of antigen in the sire. Sometimes this antibody passes the placental barrier causing death of the fetus *in utero*, or occurs in the colostrum of the dam. In the latter instance, the newly born creature acquires antibodies so that in approximately 48 hours after birth there develops an intense destruction of red blood cells, severe anemia, and icterus of a varying degree of intensity. Though apparently healthy at birth, death is the usual termination about the fourth day. The disease may be identified positively by the same serological test employed for horses. An autopsy frequently discloses an enlarged spleen, and some blood stained peritoneal fluid, and occasionally hemoglobinuria. When it is known that a dam's serum may be dangerous, it is practical in the case of horses to withhold all colostrum during the first 24 hours. After this period it is considered safe to permit nursing. However, in the case of pigs, as reported in the British project, some piglets became affected even though having been withheld from the sows for 24 hours. Since a dam once sensitized may be expected to cause the disease in offspring having a similar blood type, in swine at least, serologically incompatible types should not be used for breeding purposes. It is practical to muzzle colts for 24 hours, and during this period feed it from another source.



Small Animal

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SMALL ANIMAL PRACTICE
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Treatment Of Neurological Conditions Of Dogs And Cats*

W. N. KONDE, D.V.M., Royal Oak, Michigan and
D. F. M. BUNCE II,† Ph.D., Chicago, Illinois

DURING the past ten months, ACB_{12}®, a preparation containing 30 units ACTH and 1000 mcg. crystalline vitamin B_{12} per cc., has been used in this hospital for the treatment of neurological conditions affecting dogs and cats. Fifty cases have been studied, of which 21 were dogs treated for neurologic complications following distemper, 19 were non-distemper associated affections of the central nervous system, two were animals presenting signs of lameness for which no demonstrable etiology could be discovered in the history, physical, or radiological examination, seven were cases of acute distemper in which ACB_{12} was used prophylactically to prevent the occurrence of neurologic sequelae, and one was an animal treated for nervous involvement which developed severe withdrawal symptoms when ACB_{12} therapy was discontinued.

This investigation was undertaken following observations by Bunce[1] of a beneficial effect on central nervous system disturbances after administration of corticotropin and massive doses of vitamin B_{12} simultaneously. In a detailed report,[2] Bunce discussed the effects of the hormone and vitamin combination on the organism, and reported his preliminary findings following treatment of 470 dogs presenting neurological complications.

Wide variations from the original recommended dosage schedule were attempted. B_{12} levels of 8000 to 20,000 micrograms daily were given, but there was no clinical evidence that these increased amounts were any more efficacious than the prescribed 1,000 mcg. dose.

Distemper Syndrome

Of the 21 dogs treated in this series, all were severely affected with one or more of the distemper-complex neurological complications. These disorders include encephalitis with convulsions, hard pad, chorea, paralysis, or torticollis.

It will be noted (see table 1) that cases 4, 13, and 15 were treated for one condition, and while under therapy, developed a second neurologic manifestation. Table 2 summarizes results obtained from all 21 patients in this group.

Clinical Results

While the results of ACB_{12} therapy for neurological complications of the distemper complex in the present investigation were not spectacular, it is felt that they do justify a cautious recommendation of the treatment to the client. It is our feeling that the results

*Presented at the meeting of the Michigan State Veterinary Medical Association, Jackson, Michigan, June 23-24, 1955.

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which have been obtained with ACB_{12} therapy are better than those which could be expected before the advent of this agent.

The longest period of treatment of any animal in the series, was 11 days, but it averaged five to seven days depending on the response of the patient. In two dogs, recovery was effected following two daily injections. Treatment was terminated if recovery occurred or if the condition became more severe. If improvement was evident following initiation of ACB_{12}, the therapy was continued daily until recovery occurred, or until the improvement leveled off to the extent that we felt continued treatment would not appreciably alter the condition.

TABLE 1. Distemper Syndrome

Case No.	Condition	Days Treated	Results	Comments
1	Chorea and paralysis	2	Improvement	
2	Chorea	3	No Improvement	Euthanasia
3	Chorea	5	Improvement	
4	Chorea	4	No Improvement	Developed encephalitis. Euthanasia
5	Chorea and encephalitis	4	No Improvement	Euthanasia
6	Encephalitis	1	Died	
7	Encephalitis	1	Died	
8	Encephalitis	2	Recovered	
9	Encephalitis	1	No Improvement	Euthanasia
10	Encephalitis	2	No Imp.	Euthanasia
11	Encephalitis	1	Died	
12	Encephalitis	1	Died	
13	Encephalitis	3	No Improvement	Developed paralysis Euthanasia
14	Torticollis and Incoordination	8	Recovered	
15	Incoordination	4	Improved	Developed chorea and treated six more days, chorea improved
16	Incoordination	6	Temporary Imp.	Relapse and euthanasia
17	Incoordination	2	Recovered	
18	Incoordination	4	No Improvement	Euthanasia
19	Incoordination	6	Recovered	
20	Incoordination and posterior weakness	3	Became worse	A gradual recovery was eventually effected
21	Paralysis	5	Temporary Imp.	Relapse and euthanasia

Non-Distemper Neurologic Conditions

There were 19 animals in this group which were treated for varying central nervous affections not associated with distemper. Of these, four were cats. Table 3 summarizes the conditions treated and their results.

In none of the animals demonstrating paralysis or incoordination was there any radiological or clinical evidence of a herniated disk. Case 26, described as "dummy", was acutely ill, but mentally dull and phlegmatic. This animal recognized no one and failed to hear or obey commands. Following three injections of ACB_{12} complete recovery was effected. The two dogs with neuritis (cases 29 and 31), demonstrated extreme pain on any movement, when admitted. Dramatic relief was obtained in both animals following a single dose of the drug. Five injections of ACB_{12} were required to effect a recovery in the dog with facial paralysis (case 35). It has been our experience that most animals with facial involvement of this type will recover spontaneously with no treatment other than good nursing care. In the instance reported here, we feel that ACB_{12} probably assisted in effecting earlier return to normal.

Inasmuch as phenolized rabies vaccine is not used at this hospital, the number of patients which demonstrate a reaction following the injection is low. In both cases 32 and 33, vaccination had been carried out elsewhere. Only a single injection was required to bring about prompt remission of the paralysis in case 33, but case 32 was treated for five days before improvement was observed. The dog actually appeared completely normal and was scheduled

TABLE 2. Results of ACB_{12} Treatment of 21 Dogs Affected with the Distemper-Complex Syndrome

No. Cases	Results	Percentage
4	Recovery	19.1
3	Improvement	14.3
2	Temporary Improvement (relapse)	9.5
11	No Improvement Euthanasia	52.3
1	Condition became worse	4.8

for discharge on the sixth day, but on the morning of that day was found dead. No explanation is offered as to the cause of death. Postmortem examination was not permitted by the owner.

Evaluation of therapy in some of these cases is difficult, and it can be argued that some of the animals would have made a recovery without treatment. For this reason, only those cases are included in this report which, in our opinion, benefited by ACB_{12} therapy. All others, in which any differences in opinion might be justified, were not included.

Most of the animals in this group were given daily treatment. Only one (case 25) had an interval of several days between injections.

From the findings listed in table 3, it can be seen that in non-distemper associated disorders of the central nervous system, ACB_{12} is definitely indicated, and its use should result in a marked degree of success in the treatment of these conditions.

Lameness

Only two dogs have been treated with ACB_{12} for lameness of unknown etiology (table 4). Both animals were completely normal on physical examination; the affected joint and leg moved without impedence throughout the normal range of motion, and there were no visible wounds, bruises, or swellings. The joint ligaments and capsule appeared intact. One of the dogs was examined radiologically with no abnormal findings.

Case 41, an aged Pomeranian, was admitted to the hospital in extreme distress. The dog was dyspneic and refused to bear weight on the affected leg which was acutely painful on palpation. There was marked improvement in the patient's status following the second daily administration of ACB_{12}; the dog was completely normal after the third injection, and there has been no recurrence of the disorder in more than five months.

Case 42 was clinically similar to case 41. Various analgesics failed to effect relief of symptoms. Following a completely negative radiological survey, ACB_{12} was administered. The lameness had almost entirely disappeared on the following day. A second injection was given and recovery was effected with no recurrence to date.

ACB_{12} as a Prophylactic Measure

The use of ACB_{12} as a prophylactic agent to prevent occurrence of central nervous in-

TABLE 3

Case No.	Condition	Days Treated	Results	Comments
22	Idiopathic convulsive state	3	Recovery	
23	Epileptiform convulsions	5	Improved	
24	Torticollis and paralysis (cat)	1	Died	
25	Convulsions following vomition	2	Recovery	The second injection was given 1 week later
26	"Dummy"	3	Recovery	Acutely ill
27	Paralysis, encephalitis	3	Recovery	Acutely ill
28	Paralysis	1	Recovery	
29	Severe neuritis and incoordination	1	Recovery	
30	Torticollis and chorea of head (cat)	5	Improvement	Torticollis was hardly visible one month later
31	Severe neuritis incoordination	1	Recov-	
32	Post-vaccinal paralysis following rabies vaccine	5	Died	Appeared recovered on fifth day dead on 6th day
33	Post-vaccinal paralysis following rabies vaccine	1	Recovery	Recovered 20 min. after injection
34	Stilted gait	1	Recovery	
35	Facial paralysis	5	Recovery	
36	Fasciculation	2	Recovery	
37	Otitis media, torticollis, paralysis and incoordination (cat)	6	Improvement	Cat became deaf
38	Convulsions following car accident	1	Recovery	
39	Convulsions following car accident	1	Recovery	
40	Incoordination (cat)	2	Recovery	Struck on head by falling card table

volvement was suggested when evidence of protection against post-distemper neuropathy was observed by Bunce[3]. He administered the drug on two consecutive days as part of the treatment schedule during the acute stage of clinical distemper, and before any nervous signs were noticed. In his series, complete protection was afforded against the onset of neuropathic signs.

In this hospital, we treated seven cases which are listed in table 5.

Of the cases cited, three developed neurologic symptoms, however case 47 received only a single injection of ACB_{12}, and while case 48 received the two injections, they were given four days apart. No protection was afforded in case 45, and chorea developed about two weeks following the disappearance of distemper symptoms. Where the two daily injections of ACB_{12} were given along with routine treatment for distemper, it is felt that a measure of defense against the onset of neurological symptoms is gained.

Withdrawal of Therapy

Reaction from withdrawal of ACTH therapy is apparently not a serious problem in domestic pets. In our experience with ACB_{12}, only one dog developed what was apparently a withdrawal reaction.

A Collie was treated for six days for posterior paralysis following distemper. Improvement was apparent on the second day of therapy, and by the fifth day the dog was almost normal. An additional injection was administered on the sixth day and no treatment given on the seventh. On the morning of the eighth day, the Collie was again paralyzed. Treatment was reinstituted and continued for two weeks. Following the first injection the dog was up, and by the 14th day had made an apparent recovery. Thirty-six hours after treatment was withdrawn the dog again went down. At this time extreme nervousness verging on hysteria was a complicating factor, and at one time during the day the animal was comatose. ACB_{12} was begun again, and again there was an immediate favorable response. It was decided to reduce the dosage gradually, and during the next 17 days the quantity of ACB_{12} was decreased from 2000 mcg. and 40 units ACTH to 25 mcg. B_{12} and 2.5 units ACTH. During these 17 days the dog continued to improve and progressed to complete recovery. There has been no recurrence of the paralysis or any other untoward symptoms to date.

TABLE 4. Treatment of Lameness with ACB_{12}

Case No.	Diagnosis	Days Treated	Results
41	Lameness of unknown origin	3	Recovery
42	Lameness of unknown origin	2	Recovery

TABLE 5. Prophylactic Treatment of Dogs with Acute Distemper

Case No.	Days Treated	Occurrence of Neurologic Condition	Results
43	2	No	Protection
44	2	No	Protection
45	2	Yes	Developed Chorea
46	2	No	Protection
47	1	Yes	Developed Encephalitis
48	2	Yes	Developed chorea and encephalitis
49	3	No	Protection

That this was a true instance of withdrawal is illustrated by the dramatic response elicited when ACB_{12} was reinitiated following reappearance of the nervous symptoms.

It has been suggested that a hypopotassemia may result following prolonged hormone-vitamin therapy. Whether there was a shift in cations in this case is difficult to state, because no KCl was administered during the periods of treatment. It is our feeling, however, that a hypopotassemia, if present, was not entirely responsible for the repeated recurrence of paralytic symptoms because of the rapid and favorable response when the drug was re-administered. Had the decrease in blood potassium been responsible for the nervous signs, it is likely that these symptoms would have been aggravated.

Discussion

It is extremely difficult to properly evaluate the efficacy of any drug used in the treatment of diseases of the central nervous system. Some neurological conditions disappear spontaneously, but most are extremely refractory to any therapeutic measures yet devised. Any evaluation of treatment, therefore, can be accomplished only in the light of past experience in dealing with similar conditions.

It is our feeling that three cases recovered from distemper paralysis in less than a week,

(Continued on page 82)

Rat Rabies

Dr. L. E. Starr, Georgia Department of Public Health, has reported that rabies has been demonstrated in a rat. Late in October 1955, a rat attacked an eight-year-old boy while asleep in a bed. A deep puncture wound on the face was inflicted. The rat was killed by the boy's father who submitted it to a laboratory for examination. The brain of the rat was found to be Negri-positive and this finding was confirmed in the state health department laboratory. Specimens of the brain were inoculated into four mice, three of which were Negri-positive. Four more mice were inoculated from the first series of mice. One died of typical rabies and was Negri-positive. Specimens are now being studied at the Communicable Disease Center Virus Research Laboratory.

The boy who was bitten was given hyperimmune serum and an intensive course of antirabies vaccine. The child is normal to date.

Although rats have previously been reported in the literature as having rabies, this appears to be the first laboratory-confirmed case in this species of animals.

The most recent case of animal rabies in the county where the boy lived was in January 1955, when a dog was shown to be microscopically negative but positive by mouse inoculation. A thorough investigation of the rat population is in progress in the county.—*Morb. & Mort. Wkly. Rept.*, Dec. 16, 1955.

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Cat Scratch Fever an Erysipeloid Infection

It now appears well established that at least most of the attacks of so-called "cat-scratch fever" in man is in fact erysipeloid, at least that ubiquitous organism, *Erysipelothrix rhusiopathiae*, has been isolated from the periphery of inflamed cutaneous lesions. The human and animal strains of this organism appear to be identical. Infection as a sequel of a cat-scratch is not strange since the organism is widespread in nature including such regions as decayed vegetation, in addition to its presence in spoiled animal tissues, and in cold blooded species. It also has been isolated from poultry. As is well known, the organism is resistant to the usual adverse conditions. Even when exposed to bright sunlight it survives for at least two days, and freezing is not lethal.

Veterinarian Camille Guerin

Among accomplishments that have gained prestige for veterinary medicine, that of Camille Guérin, French veterinary scientist and member of the famous team of Calmette-Guérin who developed a vaccine for prevention of tuberculosis in man, is noteworthy. The product (B.G.G.) is a suspension of living, nonpathogenic strain of *Mycobacterium tuberculosis*.

Reproduction of the bronze medallion of his own effigy, handicraft of the talented sculptor J. Darras, was presented M. Guerin on the occasion of a celebration sponsored by the Syndical National des Veterinairies in 1936, honoring MM. G. Ramon and C. Guerin. The plaque was presented in recognition of his outstanding contributions in public health. M. Guerin graduated at Alfort in 1896, after which he became associated with Calmette, who had just founded the Pasteur Institute of Lille, the first affiliate of the Metropolitan Institute of Paris. M. Guerin was associated with Calmette from that day until the latter's demise.

The third letter of the name given the vaccine (G.) stands for Guérin who is given credit for developing the avirulent strain, and subsequently the B.G.G. vaccine, used in many countries for years for the prevention of tuberculosis among children and also for vaccination of calves.

In his recent letter to the editor, P. Blaizot, Paris, France, well-known among French veterinarians, referred to the meritorius accomplishment of his colleague and advised that Guérin today follows assiduously the life of the professor, though over 80 years of age. His presence and knowledge are appreciated greatly in the many veterinary societies of Europe of which he is a member.

Studies of Erythrocytes by Electron Microscopy from Cave Bats (*Myotis lucifugus*) Infected Intraperitoneally with the California Strain of Newcastle Disease Virus (11,914)

REGINALD L. REAGAN,[1] Maj. Ret. U.S.A., MARY GEUMLEK,[2] B.A., SING CHANG,[3] Ph.D., and A. L. BRUECKNER,[4] V.M.D., College Park, Maryland

The egg-shaped Newcastle disease virus, California strain 11,914, used for this study (test group 1) was obtained in 1946 from the Bureau of Animal Industry, Department of Agriculture, Washington, D. C. This strain was isolated by the Bureau from infected chicken tissue before the introduction of commercial live virus vaccine for Newcastle disease.

The virus culture had been carried in ten-day embryonated chicken eggs through six serial passages. In our laboratory, this strain was carried up to 32 additional passages. Allanto-amniotic fluid from several dead eggs from this strain was harvested. The virus strain was confirmed to be Newcastle disease virus by neutralization tests conducted in ten-day embryonated chicken eggs. The test was performed according to the procedure recommended by the Bureau of Animal Industry[1]. Newcastle-immune chicken serum neutralized the virus while normal chicken serum had no effect.

A pool of normal allanto-amniotic fluid was prepared in the same manner for the control group 2. The following experiment was conducted to find out if the Newcastle disease virus could be found on or in the erythrocytes and how long the virus was present in the blood stream of the cave bats.

The experiment was conducted in the following manner: Ten healthy cave bats (age unknown) were divided into two groups. They were designated as group 1 and group 2. Infected egg allanto-amniotic (0.1 cc.) fluid from the 32nd egg embryo passage was injected intraperitoneally into each bat of group 1. Normal allanto-amniotic fluid (0.1 cc.) was injected likewise into bats of group 2, control group.

The cave bats from group 1 (infected) were bled from the heart 24 hours after exposure to the virus and the blood was pooled and placed in 2 cc. of heparinized saline solution. The cave bats from group 2 (control) were treated in the same manner. Table 1 shows the interval bleedings. Each pooled blood specimen from group 1 and group 2 from all interval bleedings was prepared for electron microscopic examination by placing small drops of the erythrocyte suspension in distilled water for 20 seconds and back in sterile physiological saline for 20 seconds (saline brings out the tail form of the virus if present) before being placed on parlodion film supports which had been prepared three weeks previously. The films were dried and shadowed with chromium[2] at arc tangent 2/12 and examined under an RCA electron microscope, type EMU. The same procedure described above was carried out 48, 72, 96, 120 and 144 hours for test and control groups. The bats showed no symptoms of Newcastle disease during the entire period and were held 15 days and discarded.

Results and Discussion

Upon examination of the erythrocyte under the electron microscope, no virus-like particles were observed for the control group 2 bats (at hourly intervals stated) which had received normal allanto-amniotic chick embryo fluid intraperitoneally. A representative erythrocyte from all the control bleedings is given in fig. 1. Virus-like particles were seen in the erythrocyte suspension of the test group 1 at 72 hour intervals as shown in fig. 2. The

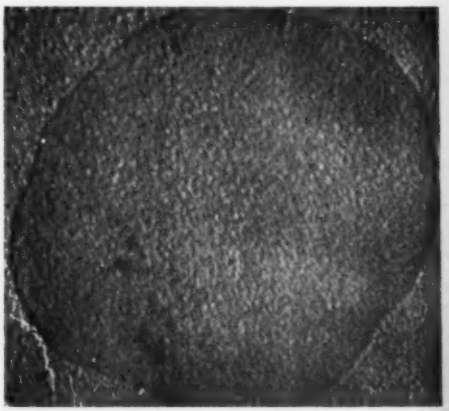

Fig. 1. Electron micrograph of a representative erythrocyte from the control group interval bleeding (48 hours), showing no virus particles. Shadowed with chromium at arc tangent 2/12.

(1) Professor of Virus Diseases, (2) Virologist, (3) Research Associate and Biochemist. (4) Professor and Director, Virus Laboratory. Live Stock Sanitary Service, University of Maryland.

CHART 1. Interval Bleedings from Heart of Cave Bats Injected with Newcastle Disease Virus

Intraperitoneally Bleeding Interval	Group 1, Test Group Virus in or on the Erythrocyte	Group 2, Control Group Virus in or on Erythrocyte
24 hour	0	0
48 "	0	0
72 "	++++	0
96 "	0	0
120 "	0	0
144 "	0	0

virus was present in or on the erythrocyte in practically 50% of the erythrocytes of the 3,000 microscopic fields examined. The virus was spherical with long tails, described by previous research workers[3,4]. The virus could not be demonstrated in the other interval bleedings.

Summary

Electron micrographs of erythrocytes from cave bats exposed to Newcastle disease virus intraperitoneally is presented. Virus-like particles were found in the 72-hour interval bleeding only. The control cave bat erythrocytes showed no virus particles in or on the erythrocyte and the animals appeared normal throughout the experiment. Studies on purified Newcastle disease virus by other research workers[3,4] showed tails on Newcastle disease virus particles; thus confirming the morphology and presence of Newcastle virus in this study.

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Historic Exhibit

A pictorial history of drugstores from the 13th century to the present has been created as an exhibit in the division of Medicine and Public Health at the Smithsonian Institution in Washington, D.C.

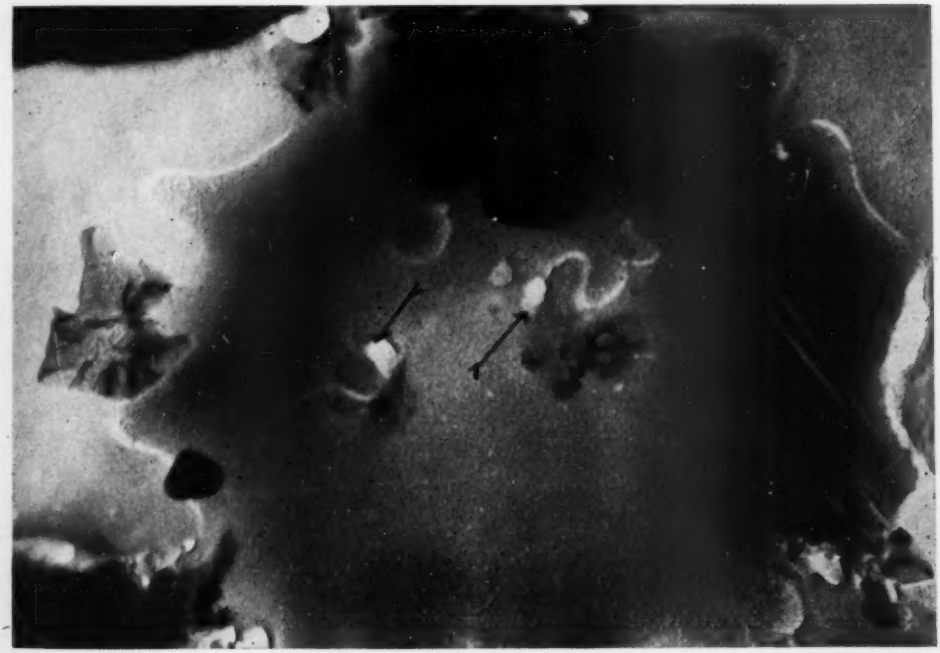

Fig. 2. Electron micrograph of an erythrocyte from the 72-hour bleeding from the test group showing Newcastle disease virus, indicated by arrows. Shadowed with chromium at arc tangent 2/12 x 50,000.

Intravenous Tetracycline in Small Animal Medicine

KENNETH B. HAAS,* D.V.M., and NOLEN D. CONNOR,** D.V.M., M.S., Kalamazoo, Michigan

This article serves to complete a series of papers concerned with use of panmycin® (tetracycline hydrochloride) in animal medicine. Two previous articles[1,2] related to oral and intramuscular forms of this newest broad-spectrum antibiotic.

Panmycin intravenous provides an efficacious dosage form for those animals unable to receive oral medication. The antibiotic readily diffuses into the various body fluids, including spinal fluid, pleural fluid, peritoneal fluid, umbilical cord serum, and saliva. It is concentrated in the liver and excreted in the bile and urine. Spinal fluid concentrations are notably higher than those produced by oxytetracycline and chlortetracycline, indicating greater ability to pass the blood-brain barrier. Studies in laboratory animals indicate this antibiotic has a low order of toxicity, comparable to that of the other tetracyclines. As more fully described in the previous articles, panmycin has a wide range of antibacterial activity against both Gram-positive and Gram-negative bacteria.

Indications in Animals

Panmycin intravenous is indicated in small animal practice in the treatment of a wide variety of important diseases, such as endometritis, peritonitis, pneumonia, tonsillitis, bacterial complications of virus diseases, feline panleukopenia, bronchitis, pharyngitis, parotitis, otitis media, nephritis, chronic stomatitis, pyelonephritis, upper respiratory mixed infections, urinary tract infections, sinusitis, infected wounds, and other infectious processes caused by tetracycline-sensitive bacteria. In treating acute infections, including infected wounds, peritonitis, and certain soft tissue infections in small animals, the intravenous route of administration is logical and appears to be preferred.

Dosage and Administration

To produce optimum therapeutic response, the intravenous dosage of panmycin is calculated on the basis of 2 to 5 mg./lb. of body weight per day and administered in divided doses. If required, dogs and cats may be placed on oral panmycin preparations for continued maintenance.

Therapy may be continued in most instances for two to four days after the animal becomes asymptomatic and/or the temperature has returned to normal. Continued therapy in certain diseases, such as acute streptococcal and staphylococcal infections, should be considered in accordance with clinical judgment.

Panmycin is reconstituted for administration and the resulting solution should be stored at room temperature and used within 24 hours. There is no significant loss of potency during this time, but it is advisable to prepare fresh solutions every 24 hours. Before administration, the initial solution should be diluted so that the concentration is not more than 25 mg./cc. For preparing these dilutions, one of the following solutions may be employed: Dextrose injection 5%, USP; dextrose and sodium chloride injection, USP (dextrose 5%); isotonic sodium chloride solution, USP; lactate—Ringer's solution, USP; Ringer's solution, USP; protein hydrolyzates 5%; protein hydrolyzates 5% with dextrose 5%; water for injection, USP.

The usual precautions for intravenous therapy should be observed, and the drug should be administered slowly. Under suitable conditions, the intravenous drip method of administration may be employed with the rate of flow regulated so as to inject no more than 100 cc. in five minutes.

Case Reports

Case 1. Dog 532, registered Beagle, six months of age, male, 6.94 kg. This animal manifested a temperature of 103.4 F. nasoocular discharge, inappetence, and lethargy. Vaccination for distemper had been accomplished at four months.

Treatment consisted of homologous bivalent distemper-hepatitis serum, 25 cc.; panmycin, 25 mg., intravenously, twice daily; cortef®[1], 50 mg., intramuscularly; and berubigen ®[2], 500 micrograms, intramuscularly. This treatment was continued daily for 13 days, at which time the dog was sacrificed.

During the first four days of treatment there was marked improvement and a return of appetite, although the temperature remained at 102.4 to 103.4 F. After this, the dog began

*From the Department of Veterinary Medicine, The Upjohn Company.

**From the Department of Pharmacology, The Upjohn Company.

®Trademark, Reg. U. S. Pat. Off. for The Upjohn Company brand of tetracycline hydrochloride.

®[1]The Upjohn Company brand of hydrocortisone. The preparation administered was cortef acetate, 50 mg. per cc., sterile aqueous suspension.

®[2]The Upjohn Company brand of vitamin B_{12}.

to display chorea and again became inappetent. Chorea became severe and generalized, with opisthotonus, convulsions, and pupillary dilatation.

Necropsy revealed an excess of cerebrospinal fluid, hepatitis, and a severe roundworm and whipworm infestation.

Case 2. Dog 470, registered Beagle, six months of age, male, 7.8 kg. This animal had recovered previously from distemper at five months of age, after treatment with distemper-hepatitis serum; dihydrocillin, readimixed®[3], every other day for three injections; and biosulfa®[4], three times daily for three days.

Four weeks later the animal exhibited a temperature of 103 F., diarrhea, watery naso-ocular discharge, vomition, inappetence, and mild chorea.

Treatment consisted of kaobiotic tablets®[5] twice daily for two days, after which the diarrhea and vomiting stopped. Panmycin, 25 mg., was concurrently administered intravenously twice daily for 14 days. Supportive therapy consisted of administering an eggnog-vitamin mixture by intubation and Ringer's solution, 25 cc., intraperitoneally, once daily.

The temperature remained at 103 F., chorea worsened progressively, photophobia developed and the dog was sacrificed on the 15th day. Necropsy revealed hepatitis and a few roundworms and whipworms.

Case 3. Twelve young mongrels, all females weighing 8 to 15 kg., were administered 1 cc./lb. of homologous distemper-hepatitis serum on admission to the quarantine room. They began to cough, sneeze, have naso-ocular discharge, inappetence, and temperatures of 103 to 105.2 F. Three had diarrhea.

Each animal was injected with panmycin, 50 mg. in 10 cc. sterile water, intravenously, three times daily for two days. Temperatures returned to normal and no further symptoms were observed by the third day in all except two of the dogs. These two animals were treated twice daily for five additional days. All made uneventful recovery. An occasional animal demonstrated muscular weakness after injection but would return to normal within one-half hour.

Case 4. Mongrel (Cocker Spaniel), less than one year of age, female, 6.5 kg. Distemper-hepatitis serum had been administered the previous week. Temperature was 105.1 F., accompanied by a watery naso-ocular discharge, lethargy, inappetence, coughing, and sneezing. Panmycin, 50 mg. in 10 cc. of sterile water, was injected intravenously twice daily for seven days. The temperature altered daily; 104, 103, 101, 101.2, 101.2 F. Weakness appeared after each injection. The dog began eating on the third day, and recovery was uneventful.

Case 5. Mongrel (hound), approximately one year of age, male, 11 kg. Animal received bivalent antiserum and had excellent appetite on entrance. On the third day it was inappetent and developed a watery nasal discharge. Temperature was 104.8 F. A purulent bite-wound was located in the shoulder area.

Panmycin, 50 mg., was given intravenously in sterile water three times daily for five days. The wound was cleaned and mycipo®[6] applied. The temperature daily ranged: 104, 104.2, 102, 101.4, 100.5 F.; for two weeks it was 100.5 to 101.4 F. On the fourth day the appetite returned and weight began to increase. Recovery was uneventful.

Case 6. Cat, age unknown, female, 2.1 kg. Cat exhibited inappetence, vomition, fetid diarrhea, dehydration, and the abdomen was tense and painful. Diagnosis was panleukopenia: WBC 2,000 (1 leukocyte per 3 fields on smear).

Phenobarbital (gr. ¼) was given for two days; dihydrocillin, 1 cc., intramuscularly every other day for three injections; panmycin, 16 2/3 mg. in 3 1/3 cc. of water intravenously twice daily for five days. Supportive therapy consisted of Ringer's solution, 50 cc. daily, both intravenously and subcutaneously, for four days. Kaobiotic, 10 cc., was given three times daily for two days. Eggnog and vitamin mixture was given as a drench twice daily for four days. During this period body temperature returned to normal. On the fifth day the cat began eating and drinking. Recovery was uneventful.

Case 7. Mongrel (Beagle), approximately one year of age, female, 7.9 kg. This animal displayed purulent naso-ocular discharge, inappetence, lethargy, dehydration, infected bite-wounds on hip and back, purulent otitis externa, and a temperature of 105 F.

®[3]The Upjohn Company brand of an injectable containing crystalline procaine penicillin G, 400,000 units; and dihydrostreptomycin sulfate, 0.5 gm.

®[4]The Upjohn Company brand of penicillin-sulfa tablets, containing penicillin G potassium, crystalline, 100,000 units; sulfadiazine, sulfamerazine, sulfathiazole, 0.167 gm. of each; and calcium carbonate, 4 gr.

®[5]The Upjohn Company brand of antidiarrheal tablets, containing neomycin sulfate, ⅛ gr.; sulfaguanidine 3¾ gr.; sulfadiazine, sulfamerazine, sulfathiazole, ¾ gr. of each; kaolin, 11¼ gr.; and pectin, ¼ gr.

®[6]The Upjohn Company brand of neomycin sulfate dusting powder.

Eyes, ears, and wounds locally treated. Panmycin, 50 mg. in 5 cc. sterile water, administered intravenously twice daily for ten days. Body temperature subsided gradually. Recovery was uneventful.

Summary

The indications for use, dosage, and administration of panmycin intravenous (tetracycline hydrochloride) are described. The case histories of 17 dogs and one cat treated with this newest broad-spectrum antibiotic are presented.

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Domestic Cats

The chapter on "The Domestic Cat," *Felis domestica,* by Alden B. Dawson, The Biological Laboratories, Harvard University, is the second longest in the book, The Care and Breeding of Laboratory Animals*, but adheres very closely to this animal in the laboratory. Certain observations of general interest are:

"Females in late pregnancy should never be transported, as abortion usually follows shipment by train or truck.

"In successful breeding of cats, a prime factor is tractable and cooperative males. These are rare and found only after repeated trials.

"Females do not readily become sexually receptive in a cage. They do much better when given some freedom to roam about.

"A corrugated-paper box with a simple opening, and bedding, provides inexpensive but adequate maternity quarters.

"A well-nourished adult animal seldom requires 'worming.'

"Ovulation in the cat is not spontaneous but is induced by coitus or a comparable artificial stimulus.

"The duration of gestation may vary from 56 to 65 days, but the normal period is usually 62 to 63 days.

"Litters vary in size from one to eight. The average is 3.88. The birth weight of kittens varies from 70 to 144 grams. Suckling is almost continuous during the first 24 hours after birth."

Following this chapter is a list of 132 references.

*Edited by Edmond J. Farris, Executive Director and Associate Member, The Wistar Institute of Anatomy and Biology, John Wiley & Sons, Inc., New York, publisher, 1950.—Price $8.

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Treatment of Neurological Conditions of Dogs and Cats

(Continued from page 76)

is three more than was possible before the advent of ACB_{12}. While this drug, like most others, does not effect a complete recovery every time it is used, the incidence of beneficial results is high compared against other therapeutic aids, and our results have been, on the whole, quite gratifying.

Summary

A series of 50 cases of central nervous involvement in both dogs and cats treated with ACB_{12} are reported. The drug appears to demonstrate a certain degree of protection against the onset of neurological symptoms when it is used as prescribed during the treatment of clinical distemper. An illustration of a case of acute withdrawal symptoms following ACB_{12} therapy is included.

Conclusions

While ACB_{12} is not to be regarded as a "cure-all," nor is it best utilized when all other therapeutic measures have failed, the degree of success obtained following its use justifies its cautious recommendation to the client for the treatment of central nervous disorders. In our experience, no other treatment has been as effective, particularly in alleviating the nondistemper connected neurological conditions. Subjectively, there is usually dramatic relief from pain followed by a return of normal appetite and a marked sense of well-being. It is our feeling that the use of ACB_{12} should be considered for the treatment of neurological disease states.

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Binding Magazines — The Do-It-Yourself Way

R. C. KLUSSENDORF, D.V.M.*
Terre Haute, Indiana

To remedy the frequent problem of locating reference information in journals to which you subscribe, a method of binding is described. Anyone can follow this do-it-yourself procedure, and it will be satisfactory for home use, although not providing library binding. Keeping volumes complete makes it much easier to find references when needed, because locating the title in the index means that the article also will be found in that same volume.

The operator needs a pair of one inch angle irons that will extend the full length of the longest magazines to be bound. With these, he needs two three-inch clamps. If more than one volume is to be bound at a time, it will be necessary to duplicate this equipment for each volume to be bound at one time.

First step is to place the issues of the volume to be bound in consecutive order with the first issue on top so that in reading it you follow through as you would in reading a book and with the index in the last issue of the periodical. One section of the angle iron is laid along the edge of a block or box in such a way that one outside face is up and the other in front. After bringing the issues into line on the bottom and the back, the volume is laid flat on the block or box, face up, and with the back extending ⅜ of an inch beyond the front face of the angle iron. The other angle iron is then placed on top of the magazines in a similar position, and the clamps are applied across the end. By alternately tightening the clamps, the whole volume is brought into a tight unit so that it is ready for binding, (fig. 1).

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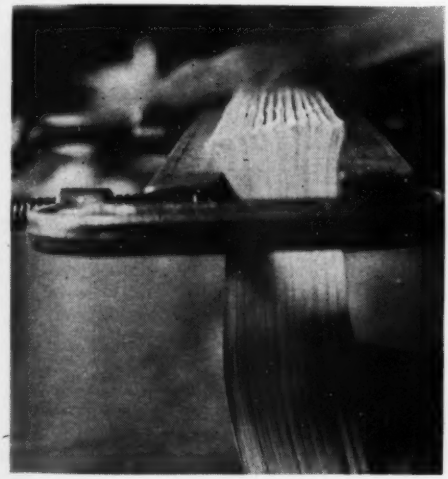

Fig. 1. Angle irons and clamps in place.

Fig. 2. Back saw, showing location and depth of cuts.

The second step in the binding process is to saw notches or slots in the backbone of the magazines at four different points. Usually the end slots are an inch or so from the top and bottom with the two middle ones spaced to give approximately equal divisions of the intervening space, (fig. 2). The location of the notches may be varied sufficiently to avoid most of the staples with which the magazines are bound, if these can be located. The sawing is done with a back saw in order to be sure that sufficient stiffness is present to prevent breaking the saw. The slots should be ¼ of an inch deep to bind the several issues firmly, but without completely destroying the margin when the volume is opened.

Third step consists of tying the volume. This is done with a 5-cord waxed linen thread[1]. The cord is woven so that both ends are used for threading and these are crossed at each slot from top to bottom and then reversed from

[1]Barber Linen Cord Company.

bottom to top so that each space between the notches has two strands of the cord. At each crossover, the cord is pulled sharply to take up all slack, (fig. 3). The cord is then tied, using a surgeon's knot which may be pulled or rolled into position so that it lies adjacent to one of the notches. In this way, the second, or square knot, can be placed upon the first one and, when the ends are cut approximately ½ inch long, may be placed into the slot and left in that position. The prominence of the knot may be reduced by pressing with the flat side of a spatula or putty knife.

The fourth step in the procedure consists of applying a glue or plastic along the backbone. In earlier work, granular glue was used, but a plastic substitute which serves the purpose more effectively has been found[2]. The material is milky-white in color but dries transparent. (It should be protected from freezing, and applied at room temperature.) Using a camel's hair or similar brush, the plastic is painted onto the volume over the cords and the area left exposed beyond the notches cut at the back. With a little patience, a certain amount of the plastic can be run into each of the slots and applied in such a way it will cover completely all of the thread used and also will cover the complete back of the volume, (fig. 4). In such journals as VETERINARY MEDICINE and *North American Veterinarian*, which are saddle-stitched or stapled as a unit and folded at the staples, more of the plastic will be used to fill the irregularities in the back. When magazines are side stapled—from front to back rather than from outside to inside—the back is smoother and requires less plastic. However, the same procedure is followed, namely that the plastic is applied over the entire back

[2]Monsanto Chemical Co. — Speedbond 301.

Fig. 3. Waxed thread crossed at each slot and pulled up tightly.

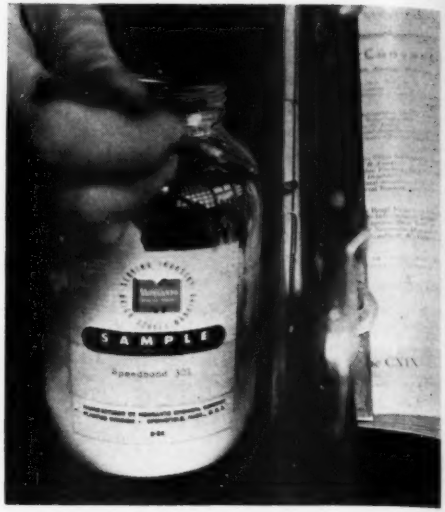

Fig. 4. Camel's hair brush for applying plastic to slots, threads and back.

Fig. 5. The completed volumes.

surface and around the edges enough to cover the slots which have been sawed and the thread which has been woven back and forth through them and tied.

The completed volume is then left in the clamps for at least six hours to permit setting. At this time, it may be desirable or advisable to

apply a second coat of the plastic. By so doing any irregularities which have been left, because the first coat touched the angle iron and therefore came away with a sharp edge, may be smoothed over and rounded up by applying a second coat of plastic along this edge. The back also will be made stronger by applying a second coat (fig. 5).

Although this method does not provide a cover and back these are not necessary for the *Journal of the A.V.M.A.*, the *American Journal of Veterinary Research, Cornell Veterinarian,* and similar magazines which carry the name on the backbone of each issue. These names, together with the volume numbers, may be read easily directly through the plastic and need no other identification. However, saddle-stitched journals will need to be identified in some way to be readily accessible when they stand in a series.

Again, this is not a finished library job. But, it can be made such readily by applying a back and cover. Various types of material may be found at your local job printer. The volumes also can be trimmed by a printer so they will be uniform on all three exposed edges.

Bound volumes serve a very useful purpose. Their value becomes greater when a five-year or ten-year index is prepared for the primary articles and case reports. Several scientific journals prepare such cumulative index volumes. *Cornell Veterinarian* has one covering the first 30 years (to 1940) and other veterinary journals possibly would do likewise if the demand were sufficient to justify the cost of preparation.

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Spinose Ear Tick Infestation in Dogs

Well known to veterinarians is the handling of spinose ear tick infestation in cattle by means of a mixture of commercial pine tar and cottonseed seed oil. It is a good remedy for infested cattle and sheep. However, when this mixture is injected into the external auditory canal of dogs (dogs employed in the herding of cattle and sheep occasionally become infested) it leaves a tarry deposit against the tympanum so that hearing is impaired. It is better to remove as many ticks as possible, mechanically, and then flush out the ear with a methoxychlor solution and repeat the treatment in a week or ten days.—*R. R. Dykstra, D.V.M.*

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A.A.H.A. meeting. Miami Beach, Florida, May 23-26, 1956.

Canine Leptospirosis

Canine leptospirosis, generally due to *Leptospira canicola,* because of the close association of man and dogs, is a growing problem for both physicians and veterinarians. Numerous surveys in the United States have indicated extensive contamination, with the etiological spirochete; as high as 38% in isolated surveys. Man contracts the infection following ingestion of canine urine-soiled food, though also through the abraided skin by contact as obtained in contaminated swimming pools, or by wading in surface waters. The organism also may gain entrance through the unabraided mucous lining of the respiratory tract, and tonsils. Cattle become infected in a similar manner, and these then serve as centers of infection. The difficulty in recognizing canine infection is enhanced by the fact that clinically the condition may be entirely without symptoms. Jaundiced animals should be regarded with suspicion, as well as those showing evidence of renal dysfunction. In short, in dogs the symptoms are variable. Detection of the spirochete, during the early stages of the infection, in the blood, and the growth in suitable media are laboratory diagnostic methods. Though present in the urine, it is difficult to isolate because of extraneous contamination. In the early stages of the disease in dogs, aureomycin® or terramycin® may control the carrier state of the disease.

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Incidence of Carcinoma in Dogs

Records of over 7,000 canine autopsies disclosed 440 cases of carcinoma. Of all the breeds, Boxers appear to be the most susceptible, while Fox Terriers and Cocker Spaniels were least frequently affected. In the following order is the frequency of carcinomatosis in some of the breeds: Airedale, Setter, and Harrier. The frequency occurring "normally" includes Pointers, Dachshunds, Schnauzers, Collies, and Scotch Terriers. The mammae and thyroid are most frequently involved. Contrary to cancer of the stomach and lungs in man, these organs are seldom affected in dogs. Aged dogs are most frequently affected.

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Hemophilia is claimed to be a sex-linked recessive factor in Irish Setters; also reported in some other breeds of dogs. *Vet. Rec.* May 1, 1955.

Your 1955 Income Tax Return

HAROLD J. ASHE

Widespread publicity continues to be given to the small minority of taxpayers who defraud the government by deliberately underpaying what they rightfully owe on their income taxes. Yet for every deliberate fraud perpetrated to reduce tax bills probably a hundred honest taxpayers unwittingly overpay, year after year.

Moreover, while tax underpayment, deliberate or otherwise, may be exposed on audit by the Internal Revenue Service, there is no such assurance that overpayment similarly will be detected, except that traceable to errors of arithmetic in computing the tax. This is not because the government welcomes overpayment. Quite the contrary.

However, Internal Revenue Services auditors are not omniscient. Ordinarily, if a taxpayer does not take certain deductions or exemptions available to him, there is nothing in his income tax return to indicate such entitlement. Therefore, whether a taxpayer avails himself of all exemptions and deductions to which he is entitled is his responsibility.

Nevertheless, a good many veterinarians continue to overpay on their annual returns. This may be due to last minute haste and failure to think through the tax implications of various acts during the tax year. It may be because of a time lag in which old rules and regulations are observed, even though the 1954 Internal Revenue Code affords certain advantages previously denied. Certainly this lag accounted for widespread overpayment last year. Therefore, this article will review only certain points concerning which there are considerable misunderstandings.

What Price Overpayment?

Veterinarians preoccupied with trying to enlarge their practice and make it more rewarding, might give a few moments thought to possible tax savings. Enlarging a practice is a first step in making a fair return on professional services. Filing an income tax return which is accurate, and in which a veterinarian avails himself of every legitimate advantage afforded him by the Code, is the final step in attaining and preserving a lucrative practice. This action is what determines the profit, after taxes, from that practice.

In overlooking as little as $100. in available deductions, a veterinarian will penalize himself $20. if he is in the 20% tax bracket. That loss very well may represent an average day's net returns from his practice. Yet care and diligence may avert this loss, enhancing his take-home pay.

Oversights not Trivial

The notion persists among many otherwise shrewd taxpayers that oversights are likely to be minor and not materially change the income tax result. This may be true in the case of filing a low-bracket state income tax return. It is certainly not the case with federal returns with the lowest tax bracket taking 20 cents on every dollar above personal exemptions and deductions.

Weigh Options

Many veterinarians, upon careful analysis, will find they are presented each year with certain options which they may exercise as their judgment, and the facts, dictate. A dogmatic attitude may be fatal. What may have been wise, in making the 1954 income tax return, may be disastrous in preparing the 1955 return. Without respect to past elections, 1955 options should be exercised primarily, if not solely, upon the basis of the 1955 income tax result. This is no less true of personal options than of those afforded in business.

Accelerated Depreciation

After year-end most of the facts surrounding a practice are fixed and can not be changed no matter how great the tax advantage. However, if *new* depreciable assets were acquired in 1955, and have a useful life of three years or more, these may be depreciated on an accelerated basis(sum-of-the-digits or declining-balance formulas). This will increase sharply the annual write-off the first years of asset lives. In turn, this will reduce earnings subject to tax. This option is available to a veterinarian who has acquired such assets in 1955, even though assets acquired in earlier years are being depreciated by the straight-line method.

However, exercising such an option should be done in the knowledge this accelerated depreciation will result in higher earnings in the last years of asset lives because then depreciation will be less, annually, than if calculated by the straight-line method. If a veterinarian's earnings are rising sharply, and he faces future years of higher tax rates, the straight-line method may afford a greater overall saving. On the other hand, if 1955

earnings have been high, and a decline is anticipated in future years (and lower tax rates), an accelerated depreciation method may save taxes. Likewise, there may be an advantage in accelerated depreciation in 1955 if individual tax rates are out in 1956, as now seems possible.

Theft and Embezzlement Losses

Such losses must be deducted in the year losses are discovered, otherwise the deduction is lost. Therefore, a veterinarian should not fail to reflect 1955 losses from this cause in his 1955 tax return, subject to insurance recovery, if any.

Standard Deduction versus Reporting Deductions

Often the standard deduction will result in a substantial tax saving for a veterinarian. It may save a few minutes time in calculating the income tax or an hour or two running down deductible items. For many, however, the standard deduction is an expensive time-saver. If itemized deductions exceed the standard deduction by as little as $50., failure to itemize them results in a tax penalty of at least $10.

Even those who habitually employ the standard deduction should make a practice of roughing out and totaling outlays which are deductible. Personal circumstances have a way of changing sharply from year to year in respect to deductions. Habit can be disastrous. A serious illness, and resulting heavy medical-dental expenses, may make itemization of deductions imperative. Acquisition of a home and resulting property taxes may be sufficient, with other items, to justify itemization when, in the past, the standard deduction was a tax saver.

Medical Expenses

Until 1954, the first 5% of adjusted gross income expended for medical-dental expenses was excluded as a deduction. Now only 3% is excluded. This additional 2% as a deduction, may be sufficient with other deductions to warrant itemizing. (Note the first 1% of adjusted gross income expended on drugs must be excluded, with the balance for drug outlays added to medical-dental expenses *before* applying the 3% exclusion rule). Moreover, a veterinarian or his spouse, if either is over 65, may ignore the 3% exclusion rule, so far as their own medical expenses are involved.

Civil Defense Workers Expenses

Veterinarians, in civil defense work as volunteers should not overlook out-of-pocket expenses. "Actual unreimbursed expenses incurred by civil defense volunteers," says a recent I.R.S. ruling, are income tax deductible "if connected with, and solely attributable to, the rendition of such volunteer services."

Other Deductions

Every deduction available, no matter in what category, should be tallied. These include property taxes, car licenses, sales taxes, state income tax, state gasoline taxes, contributions to religious organizations, schools, hospitals and charities, interest and miscellaneous deductible items, including non-business bad debts and casualty losses, such as damage to or destruction of a home or personal property to the extent not recovered by insurance. It is in zealously running down these numerous — sometimes small — deductible items that one may be able to come up with enough deductible items to aggregate considerably more than that afforded by the standard deduction. It is the last, all but forgotten, items that may pay off, tax-wise.

Dependent Parents

Probably some need to be reminded their jointly supporting with others a parent may result in an exemption being available for one or other of those contributing to the support. As in the past, the dependent may not have gross income in excess of $599.99, and the support contributed must exceed one-half. However, this "more than one-half" contribution may come jointly from two or more persons, with any one of the contributors being entitled to the exemption by mutual agreement. However, the one claiming the exemption must contribute more than 10% of the support. The others must sign waivers to the exemption for the year in question.

Dependent Children

Natural offspring, adopted children or step children now may earn more than $600. a year and still be taken as exemptions, provided the taxpayer contributes more than one-half the support. The only qualification is that the person taken as an exemption must either (a) be under 19, or (b) be a student on a full-time basis in a school or college, with school attendance involving a period of five or more months during the year. The value of a scholarship may be ignored in determining whether the taxpayer contributes more than one-half of the support.

Other Dependents

Prior to 1954, only certain closely related individuals could be counted as dependents, regardless of the support contributed by a taxpayer. Now the fact of dependency prevails, regardless of relationship, provided only such dependent lives in the taxpayer's home for the entire taxable year. Temporary absences, such as for vacation, attending school, or sickness, will not cancel the exemption.

Income-splitting Extended by Death

The new Code provides that a taxpayer may continue to have the benefit of income-splitting for two years after the death of a spouse, provided there are dependent children. This is a valuable tax assist for those with income subject to tax at a rate higher than the lowest tax bracket because income can be split to determine the tax.

Household Head

A good many taxpayers are still not taking advantage of the liberalized provisions in respect to head-of-household status. By so qualifying, a veterinarian may get about one-half of the tax-saving advantages afforded others by a split-income tax return. If, for example, a parent is supported at a place of residence other than the veterinarian's, the latter still can qualify as the head of a household. The fact of support is determining.

Child Care

A taxpayer may deduct up to $600. toward the care of a dependent child, provided he is a widower or is legally separated or divorced. However, the child being cared for must either (a) be under age 12, or (b) be physically or mentally unable to care for himself. This deduction may be taken only if actually incurred. It can not be paid to another dependent.

A child care deduction is also available when both spouses work, provided adjusted gross income is not over $4,500. If the combined adjusted gross income exceeds this figure, the $600. maximum must be reduced — for deduction purposes — by the amount adjusted gross income exceeds $4,500. Thus, $5,100. or more adjusted gross income (exceeding $4,500. by $600. or more) would completely wipe out the deduction.

Age and Blind Exemptions

Both age and blind exemptions bear watching. An additional exemption is available even though age 65 is reached as late as December 31 of the tax year. Blindness at the *end* of the tax year rates another $600. exemption for each spouse so afflicted by medical definition. If a spouse dies during the year, either or both of these exemptions are available, provided the spouse was age 65 or blind, or both, at time of demise. Many declarations of estimated income tax made in April of the tax year fail to take into account an impending birthday for one or another spouse reaching 65, or the onset of blindness, either or both of which will reduce materially the estimated tax obligation — sometimes even eliminate all tax obligation.

Aside from errors in arithmetic, whether a veterinarian pays a larger tax than the facts warrant is his responsibility and only his. Certainly if, at tax filing time, he gives this problem scant attention he can blame no one but himself for a higher tax bill than necessary.

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Concerning regulations governing importation of dogs into Great Britain, it is noted that strict provisions have been made by the Ministry of Agriculture and Fisheries for detention on prescribed premises only for a period not less than six calendar months. Facts pertaining to antirabies vaccination do not affect the order regarding quarantine.

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Top achievement of 1955, according to *Science News Letter* (Dec. 24, 1955), may be the reconstitution of an infective virus from its parts, viewed as a step toward conquering virus diseases, and the crystallization of another virus, that causing poliomyelitis, necessary for analysis and synthesis attempts.

▾ ▾ ▾

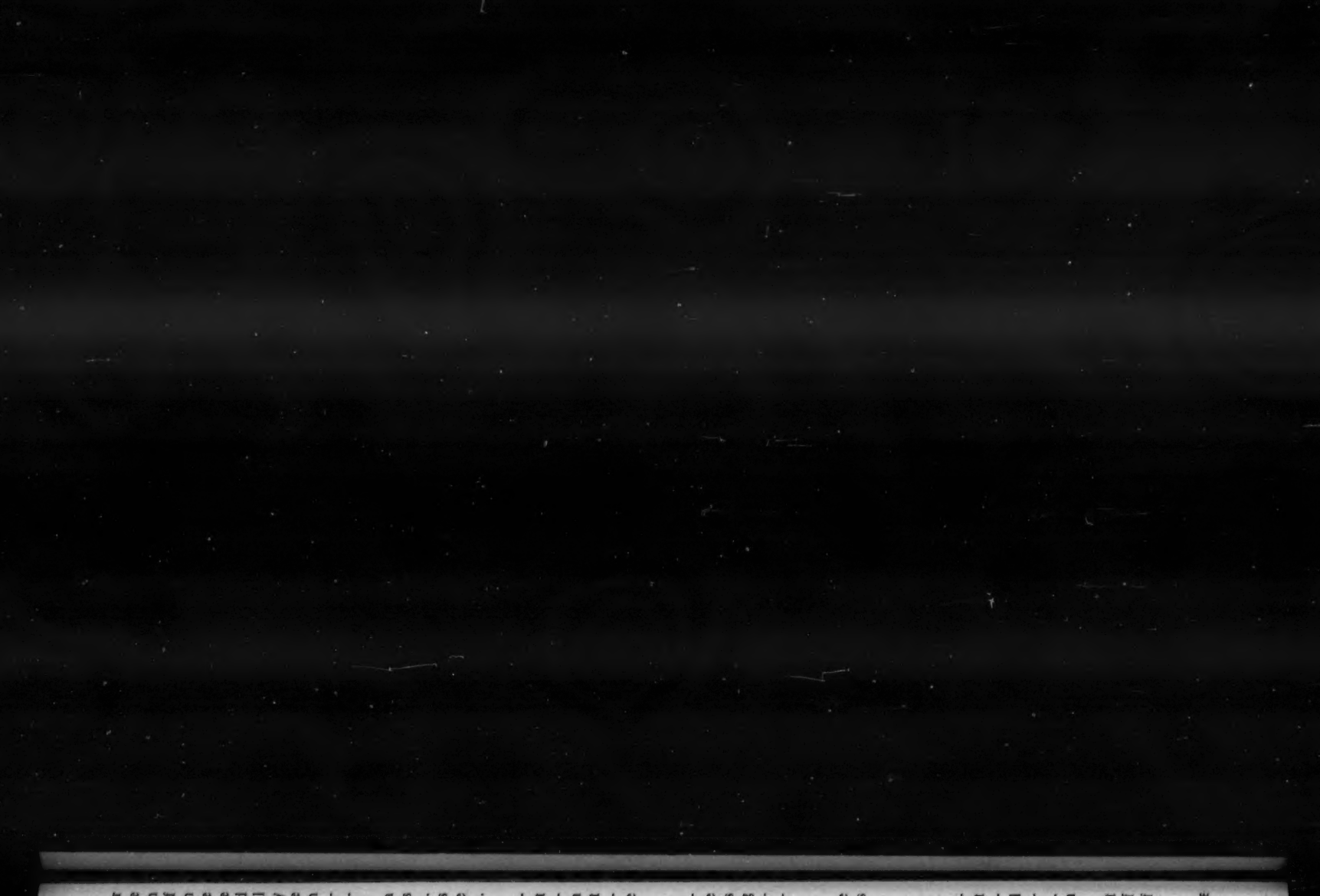
The amount of meat eaten by the average American in 1955 will probably exceed his own weight.—*S. N. L.*, Dec. 10, 1955.

▾ ▾ ▾

Skunk Carrier of Listeriosis

Members of the Veterinary Science Department, North Dakota Agricultural Experiment Station report the isolation of *Listeria monocytogenes* from the brain of a skunk referred to the laboratory for diagnosis of rabies (*Bimonthly Bulletin*, 18:49 [Nov.-Dec.], 1955. Negri bodies were revealed on impression smears.

This case is of particular interest because it establishes the skunk as a possible source of Listeria infection and as a wildlife reservoir of this serious disease of cattle and sheep.



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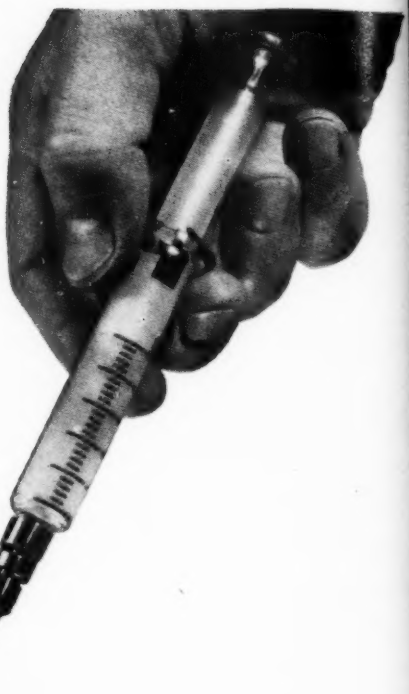

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Modified Live Virus
VACCINE
Desiccated

DISTEMPER VACCINE
Modified Live Virus
(chick embryo origin)
Desiccated

DISTEMPER VACCINE
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The Historical Background Of Some Current Problems In Animal Disease

J. F. SMITHCORS,* D.V.M., Ph.D., East Lansing, Michigan

HALF a century ago it was common practice to preface a report of research upon animal disease with a resumé of the pertinent facts bearing upon the problem from the remote as well as the recent past. There may be those who would disparage this practice today on the supposition that the then recent past had less to offer the research worker of 50 years ago. This is tantamount to saying that the immediate report was also of less consequence than the results of individual research problems as they are reported today. It would have been as unrealistic then to have relegated the work of Pasteur further into limbo with each new discovery relating to fermentation or rabies vaccine as to forget Fleming today because penicillin might be found less effective in a particular situation than some newer product.

On the other hand, it hardly could be expected that frequent contributions in a particular area should each carry what would amount to identical histories of the subject. Moreover, many problems require meticulous research in a small area, the pertinent history of which actually may be restricted to the past few years. Because of this fact, it becomes increasingly important to pause occasionally to review the broader aspects of the developments of the past. Fortunately, the concept that an idea must be either new, and thus of potential value, or if old, that it be of continuing utility, is giving way to the concept that something old may possess potential utility also. There is also an increasing willingness to acknowledge that the past may have some lessons for the future, if only to be better able to avoid the pitfalls which have ensnared previous workers. Some may derive satisfaction from a knowledge of the past as a means of appreciating better the present. In the long run however, it would seem logical to expect the most enduring values to accrue from a consideration of history as a dynamic part of the research to be applied to any particular problem. The research of today is the history of tomorrow; a minute scrap of information, whether from the present or past, may be the key to a particular problem.

The premise upon which this series of histories of particular diseases is based is simply that there may be some value to be derived from a synthesis of past thought. Whether any particular individual insists upon a utilitarian approach, or reads for his own personal satisfaction, the lessons of history are inescapable. In most times past there has been a hard core of pertinent knowledge available to

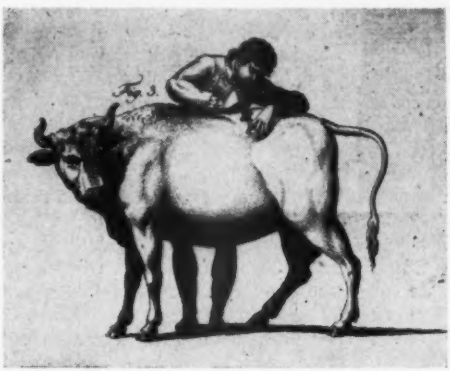

Fig. 1. Method of "stabbing hoven cattle", from Waldinger, 1810.

those who would study the past. No one can afford to assume that his current methods are the best, or that new methods must necessarily be based upon new theories, or that still newer theories must be based upon facts that are yet undiscovered. Some of what we consider to be the most advanced thought on a subject today may seem naive to the worker of tomorrow. In the long run, a study of history may yield its greatest benefits in the realization that the best that can be expected of any of us is that we make the best possible use of all the information we have, and use that as a basis for something better.

A technic of the past may have failed largely because of faulty application of a theory that may have had some merit. For example, in

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our lecture course on the history of veterinary medicine, the rationale of the once universal practice of bleeding came under scrutiny. The best answer seemed to be that the practice was based upon an outmoded relic of the ancients, who, in accord with the best thinking of early times, believed they were drawing off the ill humors, and that certain cases which responded favorably did so in spite of the treatment. In throwing the matter open for discussion, one student suggested the possibility that in the case of blood-borne infections, the removal of a large quantity of blood and its subsequent replacement via fluid intake might result in an effective reduction in the concentration of circulating organisms or toxins. Thus if the animal was not bled to death in an effort to save its life, it might have enjoyed a temporary respite from the disease sufficient to rally its own defenses. As archaic as the practice of bleeding may seem, would not the idea of bleeding with appropriate replacement therapy seem worthy of some thought, if not a trial, in certain septicemic conditions?

The potential value of a casual observation was suggested recently in an editorial by Aitkin (*Jour. Am. Vet. Med. Assn.*, 122:403, 1953) in his recollection of an experience of some 40 years ago. A number of bloated cows exposed to dampness and a cold, raw wind were found to be surprisingly improved after removal to a warm barn. Having seen the same phenomenon several times, Aitkin asks, "Could it have been the removal from the cold, damp wind? Had it been reported at the time, the date of the original observation would place it outside the body of recent data likely to be quoted by present-day workers. But does the date of an observation *per se* have any bearing upon its validity until adequate methods have been utilized to prove or disprove it?

Bloat in Cattle

In the same editorial Aitkin mentions that recent losses from acute tympanites have led to a new interest in the problem. The observation that alfalfa grown on soils rich in lime may be more conducive to bloating than that from lime-poor areas, which would seem contradictory to the practice of using lime in the drinking water as a preventive, leads to the logical conclusion that, "Apparently, we still have much to learn about bloat". In the same vein Dougherty (*Jour. Am. Vet. Med. Assn.*, 122:345, 1953) says, "General interest has exceeded carefully controlled experimental work on bloat." Among the factors which have led to increased interest in the problem, he mentions the influences of more intensive feeding, particularly with legumes, and a more intensive pasture fertilization program.

Dougherty's history of the condition in remote times is limited to the statement that, "Bloat is not entirely a new disease of ruminants," and the mention of a Roman treatment which included pouring vinegar up the nostril and putting grease in the jaws. The vinegar treatment would seem little susceptible to further investigation, for which cattle may be thankful, but the use of wagon grease has been suggested as recently as 1942 in the USDA report on the Diseases of Cattle. The latter may have led Dougherty to observe, "It is a little embarrassing when one considers the lack of progress that has been made in treatments." This very lack of progress would suggest a reappraisal of some of the concepts and practices of the past, not necessarily with the idea of a retrial of any, but as a potential springboard for new ideas.

The term bloat itself has had a curious history. Bloat (ME. blote) first meant "to soften by wetting"; in the 17th century marinated herrings were bloted, later they were referred to as "bloaters". Earlier Hamlet mentions "the blowt king" (ME. soft, flabby). The transition from blowt to bloated was not Shakespeare's doing, and later users of the term took their cue from his 18th century editors. While custom generally takes precedence over etymologic correctness, the term blown (ME. bolne, from bollen—swollen), in common use from the 16th to the 20th century, is more accurate than bloat to denote acute tympanites. The latter term is probably as old as the first descriptions of the disease. Galen (2nd century A.D.) used tympanites (from Gk. tympanon—a kettledrum) to denote "a dropsy in which the belly is stretched like a drum", and the word was absorbed into the English language before the year 1400. The term "wind dropsy" was used occasionally as late as the 19th century; likewise, "blast" (from ME. blowen—to swell), an obsolete meaning of which is "to become inflated". The present-day epithet may have had a devious origin in the "blasted" animal of earlier days. The Anglo-Saxon designation of tympanites as "elf-shot" is in keeping with the contemporary concept of causation. The appropriate leechdom called for administering "the black soot off a pot or pail of brass".

Other 16th to 19th century terms include "dew-blown", or "dew-bolne", suggesting the relation of damp herbage or the dewy vapors

themselves to the etiology. In "fog-sickness", or "fogged", the fog refers to grass, particularly marsh grass or the dead, decaying aftergrass of winter pasture. The occurrence of bloating in cattle in dry feedlots is not unknown today. Throughout the 18th or 19th centuries in this country, and yet today in Britain, bloat was more commonly designated as "hove", "hoove", or "hoven" (ME. hoven—heaved, to swell or rise). In the early 18th century hoven was also a raised cheese. Hoven cattle had the tail raised to "let the blood".

In addition to the vinegar and grease treatment, Pliny, in his Natural History (1st century A.D.), as rendered in the first English translation (1601), accuses the Greeks of inventing one of the most pernicious practices which has plagued suffering cattle throughout the ages. He says, "If kine or oxen were dewblown or otherwise puffed up, they were wont to bore holes through their horns, and to inlay or interlard them with men's bones." The rationale is a little devious, but no more so than that for the "hollow-horn" or "horn-ail", usually denoting "loss of cud", of relatively recent times; the substitution of turpentine, salt, and pepper is hardly less deserving of censure.

For more than 1,000 years after Roman times little is to be found on the subject of cattle diseases. The first suggestion of any improvement in the treatment of bloat, in English at least, is found in Fitzherbert's Boke of Husbandrie (1523). For "dewblown" he directs us to "thrust a knife in to the depth of two inches at a distance of six inches from the spine", a measure undoubtedly as effective then as now even if the technic lacks in surgical finesse. He states that the condition is caused by turning hungry animals out on good pasture, but describes the gas as being found between the rumen and the body wall, a much copied error. The first refinement of Fitzherbert's technic appears in The Herdsman's Mate (1673) by a practitioner in Ireland, Michael Harward. For dewbolne he recommends making a small incision with the lancet and inserting a quill in the manner of contemporary physicians in tapping the abdomen or chest. Dewbolne, he says, is not caused by cattle eating dewy trefoil but to a poisonous herb, for he observes that the symptoms are the same as those in forage poisoning.

The trocar and cannula had been used by Roman physicians for paracentesis, but later only the cannula was in common use until the late 16th century when the trocar was reintroduced. Just when trocarization was first employed for bloat in cattle is not certain. Delabere Blaine, in his Outlines of the Veterinary Art (1802) directs that when "the stomach is so much distended with air, that there is danger of immediate suffocation, or bursting: in these cases, the puncture of the paunch must be performed, which is called

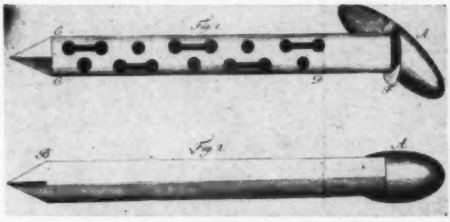

Fig. 2. Trocar and cannula "for stabbing hoven cattle", from Waldinger, Common Ailments of Cattle (title translated), Vienna, 1810.

"paunching" . . . a sharp penknife is frequently used; and persons in veterinary practice should always keep a long trochar, which will be found much the most efficacious, and by far the most safe."

"Hove", Blaine says, "has been the death of thousands, and is sufficiently terrible in its effects, to render all our exertions necessary." He blames it upon engorgegment with foods cattle like, particularly red clover, but which they are deprived of for long periods, whereupon, "they eat greedily, and forget to lay down to ruminate." Death he attributes to suffocation from pressure upon the diaphragm. In addition to emergency treatment by paunching, he suggests a pint of gin or oil in mild cases. Blaine's treatment of choice is the stomach tube, and in this respect, his is the first *bona fide* veterinary work to advocate its use. The stomach tube had been invented by the Edinburgh anatomist, Alexander Monro, *secundus*, after hearing a student describe a folk-practice of using a stiff cartrope. Unfortunately, Monro had no choice but to send the description of his tube to the editors of the miserable Complete Cow-Doctor (1792), by Joseph Rowlin. Monro's communication in 1793 had to await the second edition of this work in 1799. The use of the stomach tube must have caught on rapidly for Blaine (1802) says, "The introduction of a probang, or tube, is now a very general method, and is, from its simplicity, very eligible one." He also mentions a solid cane with a knob of wood on the end, as being simpler than the Monro tube which was made of tightly coiled wire covered with leather. The use of the stomach tube was practically a lost art by 1850, and it

remained for American veterinarians to reintroduce it as a general practice near the turn of the century.

Medical treatment of hoven in America, as reported by R. L. Allen in his text on Domestic Animals (1847), consisted of administering one or more of the following: A pint of gin, one or two pints of lamp or other oil, strong brine, milk and tar, an egg-shell full of tar, ammonia, gunpowder and lard, limewater, or a pint of "tolerably strong" lye. Should these fail, the use of the probang was recommended. The eminent British veterinarian, Youatt, in his text on Cattle (1834, *et. seq.*), which was widely reprinted in America (1836, *et. seq.*), had recommended the stomach tube, and was one of the first to publicize the use of the stomach pump. He was an early advocate of rumenotomy in selected cases. But farmers, according to Dadd in his American Cattle Doctor (1858), preferred "the fashionable system of making a chemical laboratory of the poor brute's stomach." Dadd recognized the utility of operative intervention, but considered it dangerous. He preferred using stimulants and carminitives together with kneading the abdomen to liberate the gas. Contrary to the common practice of dashing cold water upon the sides of the animal, his recommendation of the external application of warmth is a little suggestive of Aitkin's observation concerning removal of affected animals to a warm environment. He also considered an excess of nitrogen or carbonic acid in the soil as an exciting cause, but more in the sense that this led to noxious vapors being given off at night. As a preventive measure he therefore recommended stabling cattle at night.

Youatt mentions excessive fermentation of greenstuffs as the chief cause of bloat, and the impedence of circulation and respiration as the immediate cause of death. He recommends exercise, followed by the administration of alkalies and oil. Because of the dangerous consequences of using a knife, he suggests that each farmer should own a trocar and cannula, but recommends the stomach tube and pump. Solutions of chlorides of lime, potash or soda should be pumped in after liberation of the gas because of the chemical affinity of chlorine for the hydrogen in the methane and hydrogen sulfide, which he recognizes as major constituents of the gas. After treatment consisted of purges and stimulants. Concerning the observation that cows frequently do not return to full productivity after recovery, or some show a proclivity toward recurrence of bloat, Youatt suggests, "A beast, whose paunch has been distended to any considerable degree, should be prepared for the butcher, or sold immediately, if in tolerable condition; for a stomach, whose muscular fibers have been so stretched and enfeebled, will not soon do its full duty again.'" The suggestion that the character of bloat may vary with the territory is borne out by the remarkable report of the Britisher, Steele: Diseases of the Ox (1887), that the concentration of hydrogen sulfide may vary from none to 80%.

The numerous theories and almost innumerable methods which have been brought to bear upon the problem of bloat are silent testimony to the fact that bloat is still a problem. In commenting upon the chaos produced by the cattle plagues of the 18th century, the physiologist, Haller, observed that, "The ancients have got very near the truth, and the vulgar have known the nature of the disease better than the learned." In somewhat similar vein, Dougherty quotes the fable of the blind men and the elephant: " . . . each was partly in the right, and all were in the wrong." It is hardly within the province of an armchair amateur to pass judgement upon the men or methods of the past or present; all that is intended is to record some of the more pertinent thoughts of those who, when the final chapter is written, may be found to have been "partly in the right".

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Progress in Vesicular Exanthema Control

According to a special report, issued by the Agricultural Research Service, USDA (November 1955), slightly more than one-half of the hogs being fed raw garbage in the United States, approximately 121,000, are produced in New Jersey. In that state, garbage was being cooked on only 46 of 436 garbage-feeding establishments as of September 30, 1955. Of premises feeding garbage, 80% are inspected semimonthly for vesicular exanthema and to determine that proper cooking methods are followed on those premises where cooking is practiced.

Texas ranks second among the states in which hogs are fed grabage without cooking. Approximately 45,000 head are fed in 1,036 establishments, on only 124 of which cooking facilities are operated. Texas has no inspection regulations.

Medicated Feed Problem Under Study

Recent growth in use of medicated livestock feeds has created new problems for feed manufacturers, drug manufacturers, and regulatory officials, according to Federal Food and Drug officials.

To aid in solving these problems F.D.A. has announced a public two-day symposium on medicated feeds, to be held in Washington, January 23 and 24, 1956.

Commercial feed manufacturing is a $3,500,000,000. industry. It has become a major market for drugs such as hormone-like substances and antibiotics. These materials, which also are subject to various regulatory controls, are added to feeds in extremely small proportions.

Under the law, such feeds are required to contain, at the time of purchase, the amounts of the drugs which are declared on their labels. This involves such problems as methods of mixing, production control, assay technics, expiration dates, claims of efficacy, and related research problems.

In announcing the symposium George P. Larrick, Commissioner of Food and Drugs, U. S. Department of Health, Education, and Welfare, said that in the past five years the practice of medicating feeds has become almost universal in the industry.

"Under the Federal Food, Drug, and Cosmetic Act medicated feeds are defined as both drugs and foods for animals," Mr. Larrick said. "As such they are subject to both the safety and labeling requirements of the law. In consequence, feed manufacturers have become drug manufacturers with new problems which also affect their suppliers and control officials. We hope that this forthcoming symposium will promote better understanding of the problems in this fast-moving, highly technical field."

Papers already have been scheduled on various phases of medicated feeds, including such topics as: Types of medicated feeds, federal and state regulations regarding medicated feeds, manufacturing problems, and the future of medicated feeds.

All persons interested in attending the meetings are requested to get in touch with Dr. Charles G. Durbin, Associate Veterinary Medical Director, Food and Drug Administration, Washington 25, D. C.

Importation of Bovine Semen

Statement made in the October 1955 issue of VETERINARY MEDICINE pertaining to the importation of bovine semen can not now be substantiated and is therefore retracted as in error (see *Vet Med.*, 50:XXXII [Oct.], 1955).

The attention of the editor also was drawn to section 306 (a) of the Tariff Act of 1930 by officials of the USDA. These regulations contain " — absolute prohibition against the importation of cattle, sheep, or other domestic ruminants, or swine, or fresh, chilled, or frozen beef, veal, mutton, lamb, or pork from countries where rinderpest or foot-and-mouth disease is declared to exist. The Department's applicable regulations further prohibit the importation of fresh, chilled, or frozen organs, glands, extracts, or secretions derived from ruminants or swine originating in any country where the above-mentioned diseases are declared to exist, except for pharmaceutical purposes."

We also are advised that, "The Department's regulations governing the importation of animal semen are contained in Part 92, Title 9, Code of Federal Regulations. Section 92.4 (b) provides that no animal semen may be imported from any part of the world unless the importer first obtains a permit from Animal Inspection and Quarantine Branch, A.R.S."

Both England and South Africa are declared to be infected with rinderpest and/or foot-and-mouth disease so that no permits have been, or will be issued for the importation of semen originating in these countries.

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Leptospirosis Vaccination of Cattle

Cattle vaccinated for leptospirosis usually react positively for varying periods in manner and degree indistinguishable from reaction resulting from natural infection. For this reason, many practitioners are reluctant to vaccinate clean herds, preferring to use the prophylactic agent only in the face of an outbreak. Decision to vaccinate rests with owner and veterinarian. Management practices to assure a leptospirosis-free herd are recommended beginning with exercise of care in the selection of herd-replacements.

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The National Office of Vital Statistics reports that to November 12, a total of 1,118 cases of human brucellosis have been reported for 1955.

Pasteurellosis: Another Baby Pig Disease

BERT W. BIERER*, V.M.D., Columbia, S.C.

During a four-month period (May to September) in 1955, baby pigs from four widely separated premises were found to be affected with an apparently identical disease. In view of the fact that these infected herds were detected by delivery of baby pigs to the state laboratory for examination, it can be assumed safely that a good deal more than the number of herds detected actually existed during the same period. The matter is of special importance because the disease appears to be rather widespread and yet is not specifically referred to in any of the native texts covering the infectious diseases of domesticated animals.

Pigs affected ranged in age from two to six weeks. The condition first appears, to the close observer, as a moderate diarrhea. Animals formerly healthy begin to waste away, develop a cough, and may show evidence of arthritis in the later stages. There may be some rise in temperature or, in some instances, a subnormal temperature. Mortality varies from low to high depending upon the efficiency of the husbandry under which the individual herd is maintained. The greatest loss, however, is from stunted pigs that fail to thrive in a normal manner. In every case the statement is heard: "Doc, if you can't do something about this disease, I'll be forced out of the hog business."

General postmortem findings are uniformly identical and are adequately described by what appears to be a brief account of the disease by Hutyra, Marek, and Manninger, as serofibrinous or fibrinopurulent pleuro-pericardioperitonitis, sometimes complicated by multiple arthritis[1]. The diagnostician who has had a good deal of experience with postmortem examination of Pasteurella infections in turkeys, chickens, hogs, and other species of domesticated animals, immediately feels that he is dealing with a Pasteurellosis. Routine attempts to isolate *Pasteurella multocida*, however, are not always successful, and Pseudomonas species, *E. coli*, streptococci, and staphylococci, also may be present in the lesions observed. The fact exists that a virus may be associated with the disease problem described. Along these lines we find in one text[2] that the swine influenza virus, in combination with *Pasteurella suiseptica*, "produces atelectasis, catarrhal pneumonia, fibrinous pleuritis, fibrinous pericarditis, and in some cases a fibrinous peritonitis." This later description is similar to that quoted from Hutyra, Marek, and Manninger in the foregoing.

Depending upon the nature of the mixed infection, injectable sulfonamides may or may not be specific treatment. If a definite, favorable response is not obtained from such medication within 24 hours, then injectable antibiotics should be administered for supportive treatment. In view of preliminary evidence that streptomycin demonstrates an unusual degree of inhibition of *Pseudomonas aeruginosa* on sensitivity tests, streptomycin appears to be the antibiotic of choice. In addition, mixed porcine bacterins used on a herd basis give encouraging results in the field as a control measure. Unfortunately, such bacterins do not contain *Pseud. aeruginosa*. In one instance, control of the disease was successful, but its recurrence in subsequent litters resulted in a continuing economic loss and what appeared to be a cycle of infection could only be eliminated by removing sows to clean ground, on what would be the equivalent of a different farm, for farrowing.

Summary

A disease of baby pigs is described which may be of considerable economic importance to the swine industry. The disease is subacute, and later chronic, and attacks the serous membranes of the chest and abdominal cavities and later the joints. Postmortem lesions resemble those of Pasteurellosis and may be complicated with bacteria of low virulence. Recorded information indicates that a virus, of the nature of swine-flu virus, for example, may in some way be associated with this condition. Recommendations have been made relative to control and treatment.

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2. Runnels, A. R., Swine Influenza. Animal Pathology. Ames, Iowa State College Press, 1946, p. 578.

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Research has advanced knowledge and has been encouraging on the action of certain virus diseases on selected cell forms. Its promise of usefulness is for treatment of cancer.

*In charge of Diagnostic Work, Clemson Livestock Laboratory.

VETERINARY NUTRITION

MORRIS ERDHEIM, D.V.M.
Chicago, Illinois

Optimum Calcium:Phosphorus Ratio for Pigs

At the 1955 Cornell Nutrition Conference for Feed Manufacturers, Bohstedt of Wisconsin, reported that excessive intake of calcium can be harmful to pigs. High intake of calcium renders growing pigs susceptible to parakeratosis. A series of tests in which the calcium-phosphorus ratio was widened from 1.1 to 2.9 parts of calcium to one of phosphorus, showed that as the ratio widened the rate and economy of gain was lowered. With inadequate amounts of vitamin D, or with inadequate exposure to direct sunlight as the equivalent of vitamin D, results would be much more severe. Work at Wisconsin indicates that a relationship ranging from 1.1 to 1.5 parts of calcium to every one part of phosphorus in rations of pigs has been most favorable.

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Livestock Losses from Obscure Causes

In discussing some little known causes of livestock losses at the Missouri Feed Conference, Dr. A. A. Case of the Veterinary College at Missouri University mentioned faulty management and other factors, such as high nitrate content in hay or silage, as being responsible for livestock losses.

He illustrated faulty management with a report of swine which had developed rickets-like symptoms on what seemed to be a good hog feed well supplemented with vitamins A and D. However, the water on this farm was very hard. Coupled with the minerals that were being fed, the extra minerals in the water caused a mineral imbalance of the ration.

The trouble caused by high nitrate in the feed was illustrated with a report of beef calves born to cattle which were on a good feeding program. The calves were born with hearts beating, but they were unable to start breathing. The calves were suffering from methemoglobinemia. Examination of the ration showed it to be high in nitrate content. Vitamin A analysis of the blood serum revealed values which were too low for the particular time of year. This indicated a deficiency in the apparent presence of plenty.

Vitamin A — Carotene

Feedstuffs of plant origin supply the animal with precursors, or provitamins, of vitamin A. These are the carotenes, the most common of which is beta-carotene. Green, leafy plants like grass, alfalfa, and clover are good sources of carotene. Carrots, yellow corn, and sweet potatoes also may contribute significant amounts.

The carotene is converted to vitamin A by the animal. Poultry does this more efficiently than animals. Ruminants utilize carotene least efficiently.

Eveleth of North Dakota[1], reported an inverse relationship between the degree of nematode infection in lambs and the ability to utilize carotene. The heavier the infection, the less efficiently did the lambs convert carotene to vitamin A.

When we couple this observation with the assertion by parasitologists like Doctor Todd of Wisconsin, that all cattle suffer from some degree of nematode infection, we see a simple example of the relationship between nutrition, malnutrition, and a disease process.

Another step in this particular inter-relationship is seen in the report of Wisconsin workers[2]. This work indicates that lambs which are experimentally parasitized with nematodes lose about 200 cc. of blood a day—or approximately ½ lb. This means that a substantial amount of feed must be wasted to take care of the needs of these parasites. In addition, the B vitamin level of the blood of these parasitized lambs dropped sharply.

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There are approximately 4,400 purebred milk goats and 8,900 grades in Los Angeles County, California. Production value of milk for calendar year 1954 was estimated at $1,234,000.

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New Gaines Veterinary Film a Tribute to Small Animal Man

Friend of a Friend, a motion picture that pays tribute to doctors of veterinary medicine has been produced and will shortly be placed in circulation by the Gaines Dog Research Center, New York, according to an announcement by Harry Miller, director.

The picture, intended for educational showings on television and before all manner of organized groups, was produced with the technical assistance of the A.V.M.A. and the A.A.H.A. To ensure accurate portrayal, the role of the veterinarian in the film is taken by Dr. Hadley C. Stephenson, associated for many years with the small animal clinic of the veterinary college of Cornell University and now veterinary consultant to the Gaines Dog Research Center. A work of the Institute of Visual Training, the script of the picture was written by Irve Tunick, known for his "Cavalcade of America" TV series, and the commentary is by Mel Brandt, noted TV personality.

Friend of a Friend focuses attention on the special services to pets by the practitioner who cares for small animals by following one over a day's activities both in and outside his office. Shown are the knowledge and skill he is called on to apply in varied situations, and the modern facilities at his disposal in helping his patients. Portrayed also are the long years of intensive study in preparing himself for his life-work, and the vital part played by researchers in veterinary colleges, pharmaceutical, and nutritional laboratories and elsewhere in aiding him to do the best possible job.

A 16mm. production, Friend of a Friend is complete with sound, and runs 14½ minutes. It is planned to restrict showings to veterinary groups in the early part of 1956 after which the film will be made available for television showings and on free loan to responsible lay groups. Correspondence regarding bookings should be addressed to the Gaines Dog Research Center, 250 Park Avenue, New York 17, New York.

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Detroit Civil Defense Planning Session

In a symposium believed to be the first of its kind in the nation, dentists, veterinarians, and physicians met in Detroit November 16 for a one-day discussion of areas in which they could serve best in the event of atomic disaster. The symposium drew 34 veterinarians, 49 dentists, 191 physicians, and 51 Civil Defense officials and others.

The symposium was sponsored by the state societies of the three professions together with the Michigan Office of Civil Defense and Lederle Laboratories, a subsidiary of the American Cynamid Company.

A highlight of the meeting was a panel discussion by representatives of the three professions: Dr. Max L. Lichter, codirector of the Detroit Office of Civil Defense and chairman, Wayne County Medical Society Committee on Civil Defense in Detroit; Dr. Russell W. Bunting, dental consultant to the Federal Civil Defense Administration; and Dr. C. F. Clark, dean of the College of Veterinary Medicine, Michigan State University, East Lansing, Michigan.

Doctor Lichter outlined plans for handling casualties in disaster and referred to need for assistance from dentists and veterinarians. Doctor Bunting declared dentists need the cooperation of medical men to help dentists get ready to lend their skills and training in event of disaster and asserted that dentists should be included in Civil Defense planning and that one or two dentists should be included in each hospital unit.

Dean Clark advised that some training and a chance to show what they could do, veterinarians could act as assistants to the medical men. He asked that veterinarians be given an opportunity to suggest areas in which they can serve. Among such areas mentioned were utilization of veterinary training for inspection of food supplies and assuring sanitation, aiding in treatment of human casualties, and minimizing threat from animal diseases.

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Cattle continue to have a propensity for consuming their own placentae — the reason we do not know, but we do know that these tissues remain undigested in the rumen and may decompose to cause serious ill health, probably a toxemia, and therefore, through the medium of a rumenotomy, offending material must be removed.

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A patent reportedly has been issued for the feeding of waste news print to ruminant animals. This waste news print was found to be 59% digestible, and was reported to be palatable when molasses was added. Minerals and ink did not interfere with digestion. While more work is needed before old newspapers become a routine part of cattle feeds, it does seem interesting that cellulolytic activity might be able to convert this waste product into a useful feed ingredient.

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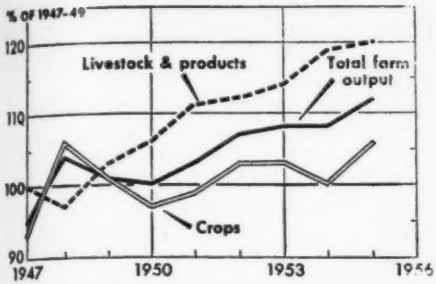

Production Gains — The increasing importance of animal agriculture is illustrated in this U. S. Department of Agriculture chart. Both crop and livestock outputs were at record levels in 1955, but production of livestock and livestock products has increased considerably more in recent years than crop production.—From *Feedstuffs*, Dec. 24, 1955.

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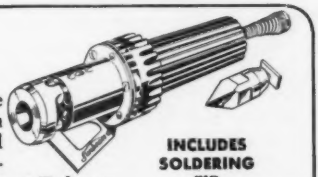

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Antibiotic Research Continues To Be Rewarding

Three newly-discovered antibiotics which show promise of extending the medical usefulness of this group of drugs were described before the third annual Symposium on Antibiotics sponsored by the Food and Drug Administration at Washington, D.C., on November 3.

One of these, called thiostrepton, is of interest because of its effectiveness in laboratory experiments against certain disease-producing organisms that show a tendency to develop resistance to penicillin and other presently-known antibiotics.

The other two, designated amphotericin A and B, because they are obtained from the same mold culture, show promise of effective action against a wider variety of infectious fungi than any of the present antifungal agents available for use in man. This area of antibiotic therapy is relatively new, the first safe antifungal antibiotic, nystatin, having been made available to the medical profession only a year ago.

All three of the new antibiotics were discovered and reported on by scientists of the Squibb Institute for Medical Research, New Brunswick, New Jersey.

Thiostrepton was isolated by the Squibb investigators from a mold of the Streptomyces family found in a soil sample from a desert area in New Mexico.

The drug was described as highly active against a variety of staphylococcic organisms which have a tendency over a period of time to build up resistance to penicillin and other known antibiotics. Many of the deaths that still occur from infections, despite the use of antibiotics, are due to staphylococci.

Like thiostrepton, the amphotericins were also isolated from a hitherto unidentified mold of the Streptomyces family. The strain was found in a soil sample obtained at Tembladora on the Orinoco River in Venezuela.

The amphotericins have been found to possess marked activity against a wide variety of disease-causing fungi. Amphotericin B is several times more active than amphotericin A against yeasts and yeast-like fungi, while amphotericin A is active against a broader range of fungi, it was reported. Neither antibiotic appears to have appreciable action against bacteria.

In experimental infections in mice simulating various serious fungal infections in man, amphotericins have been found to be effective when administered by mouth. Other antifungal agents—with the exception of nystatin, which is specific for monilial infections in the intestinal tract, are either ineffective or too toxic when so administered.

In addition, skin infections such as ringworm have responded to treatment with amphotericin ointment.

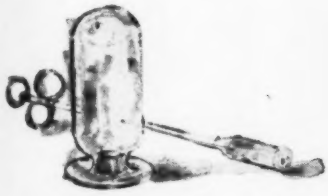
All three of the new drugs are undergoing further laboratory and clinical evaluation to determine their suitability for general use in human and veterinary medicine.

▼ ▼ ▼

Garbage feeders in California report that since feeding the cooked product they have not had the troublesome problem of diarrhea among fattening swine. Ranchers have ceased antibiotic pellet feeding to correct serious outbreaks commonly occurring in lots of hogs fed raw garbage.

▼ ▼ ▼

New York City plans to require that all grade A milk come from Brucella-free herds after January 1, 1956.



JOHN McFALL WITH TWIN CALVES he fed, which proved the difference worm control makes. Calf at right looks normal for a 4-month-old, but is 50 pounds lighter than its twin that got "Pheno" in its feed.

Why "healthy" herds need worm control

Cattlemen are becoming increasingly aware of the problem of low-level worm infection in their stock.

Experiment-station work and projects like the one illustrated above are clearly demonstrating that stomach worms hold back the growth of practically every herd in the country. Worm control can produce a definite profit bonus* in beef and dairy herds, even when worm loads are so light as to produce no clinical symptoms.

A two-way program of control with the anthelminthic phenothiazine is recommended. First, use therapeutic doses of the drug to eliminate adult worms; then keep down reinfection and suppress the production of viable parasite eggs with low-level feeding of phenothiazine in supplement, mineral mix or salt.

NEW INFORMATION ABOUT INTERNAL PARASITES, a review of developments in livestock parasitology, is compiled regularly by Du Pont for veterinarians and animal health specialists. For your copy or for specific information on the control of internal parasites with phenothiazine — simply write to Du Pont, Room 4157-D, Wilmington 98, Delaware. Phenothiazine products are available through suppliers of veterinary products.

**Each dollar spent for phenothiazine returned $12 in feed economy and faster gain for John McFall, Mineral Point, Wisc.*

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BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

Phenothiazine

FOR SOLID IMMUNITY

In the face of known exposure to hog cholera, pigs vaccinated as long as three years before with VIRACINE and anti-hog cholera serum have proved to be SOLIDLY IMMUNE

CUTTER

Viracine®

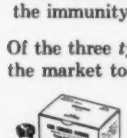
HOG CHOLERA VACCINE

The basis for Viracine's superior immunizing ability is this:

Viracine is produced in glass on laboratory media. This exclusive method of production assures you a live modified virus that can be, and is, carefully controlled and checked for *virulence*, *safety* and *potency*. Animal passage plays *no part* in its modification and has no part in its production.

And you can see Viracine's difference for yourself—in the dried vaccine, in the reconstituted vaccine and, most important, in the immunity produced in the pig.

Of the three *types* of live, attenuated hog cholera vaccines on the market today, only one (Viracine—Tissued Cultured) is not available to the layman under one label or another. Viracine is your vaccine exclusively. It comes in 5, 25 and 50 dose packages, complete with diluent. Order Viracine from your Cutter Veterinary Supplier.



CUTTER Laboratories
BERKELEY CALIFORNIA • CHICAGO, ILLINOIS

CUTTER

LEADERS FOR YEARS IN HOG CHOLERA VACCINES

FOR PROBLEM HERDS

B.T.V.®

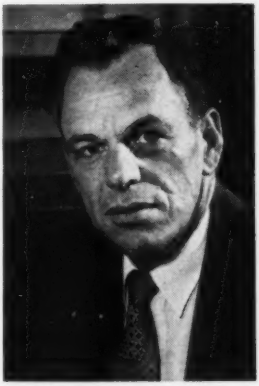
CUTTER

Safe, too, for pregnant sows
Can't spread hog cholera
Does not throw pigs off feed
No virus setback
Economical to use

"Millions of hogs have gone to market protected by B.T.V."

Cutter Acquires the Haver-Glover Laboratories

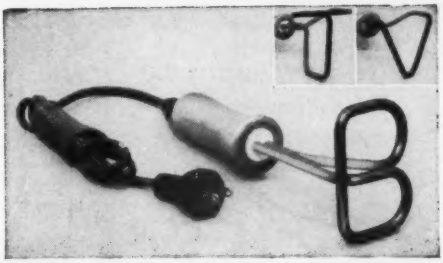
The assets, business and properties of the 35-year-old Haver-Glover Laboratories, 19th Street Terrace and Broadway, Kansas City, Missouri, was taken over by the Cutter Laboratories of Berkeley, California, on December 28, 1955. The transaction involves cash and a block of newly issued 4½% convertible, preferred Cutter stock.



Dr. Joseph Knappenberger

The Haver-Glover Laboratories was established in 1920 by Mr. Clif V. Haver and Dr. E. K. Glover with a policy of sales to graduate veterinarians only, which brought early recognition to the firm. Haver had been previously associated with the American Veterinary Supply Company, while Glover owned the Royal Biological Laboratories. Veterinary pharmaceuticals were immediately added to the biological line along with veterinary instruments through the acquisition of Sharp & Smith of Chicago. Doctor Glover retired from the business in 1925 to reenter practice but Haver carried on to build a national organization with branches and distributors all over the nation.

The strictly ethical policies of Haver-Glover Laboratories will be maintained the same as were those of Ashe Lockhart, Inc., which firm was acquired by Cutter Laboratories in February, 1955. Management of both companies will work closely together in the future since Dr. Joseph Knappenberger, president of Ashe Lockhart, Inc., will also head Haver-Glover Laboratories, Inc., as president and director. Rudolph Seiden, chief chemist of Haver-Glover Laboratories since 1938, has been appointed vice president in charge of production



NEW electric dairy cow branding iron available with B, T or V

Here's the neatest, slickest thing in branding irons yet. This new NICHOLSON *electric* branding iron heats in only 90 seconds on regular 110 volt AC-DC current! Just plug it into house or barn wiring. Won't smoke or corrode. Uses the same fast-heating elements they use on the newest electric ranges. Element is formed into 3½" letter B, T, or V. Supplied complete with 6 foot cord for $21.50. Special 25 foot extension cord, $6.00. Prices FOB Denver. All NICHOLSON precision veterinary equipment is guaranteed—money back if you aren't satisfied. We ship mail orders the same day they're received if at all possible. Order your new *electric* branding iron today. NICHOLSON Manufacturing, Inc., Box 7115, Denver 6, Colorado.

NICHOLSON
precision veterinary equipment

Helps **P**rotect
the men
who protect
the herds of America

with . .

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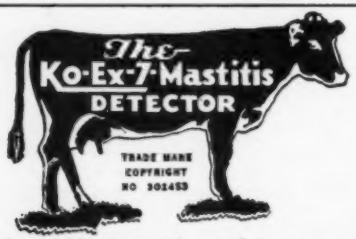
SPECIAL
DAIRMOL DUSTING POWDER
FOR GRANULAR VAGINITIS

Antiseptic **Astringent**

"THE DAIRMOL WAY"

Compounded under the direction of veterinarians of exceptional experience. Highly recommended by leading herdsmen as the best treatment for the purpose.
Also mfrs. of LIQUID Dairmol Antiseptic and Deodorant.

DALARE ASSOCIATES
23rd and Locust Sts. PHILADELPHIA 3, PA.



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Sterling Research Corp.
Dairy Div. VM. Buffalo, 3, N. Y.

▼ ▼ ▼

and research. Carl Lindberg, who has represented Haver-Glover at meetings since 1931 will head the instrument department. Other department heads will continue in their present capacities.

Mr. Haver will remain as member of the board of directors. Among other members of the board are: Dr. Guy A. Railsback, Dr. Norwood H. Casselberry, Mr. Harry R. Lange, and Dr. Robert K. Cutter, the latter now president-elect of the American Pharmaceutical Manufacturers Association.

▼ ▼ ▼

Immunization for lungworm infection in calves is the subject of experimental studies by Agricultural Research scientists Rubin, Weber, and Lucker.

Studies stem from observation that acquired immunity resulted following recovery of initial lungworm infection. So far a protective degree of immunity has been demonstrated by exposures that have proved fatal to unprotected calves.—*Agric. Res.*, Dec. 1955.

Antibiotic-Treated Human Food

In a brief report appearing in *Science News Letter* (December 10, 1955) it is stated that the U.S. Food and Drug Administration had granted permission for use of chlortetracycline (aureomycin®) as a preservative for uncooked poultry. Rate of permissible use allows no more than seven parts per million of the antibiotic to remain on treated carcasses. Decision in regard to quantity was based on evidence that cooking destroys this concentration so that none is left when the meat is served.

Chlortetracycline is added to water used for chilling after dressing. It is claimed to inhibit development of organisms associated with meat spoilage and thus prolongs freshness.

For some years manufacturers of a number of food products have sought scientific data and permission to add agents that would assure preservation of canned or frozen foods. F. D. A. has exercised caution because of inherent danger to public health. Benefits of agents are lost if consumers develop sensitivity.

We believe there are other dangers in this practice of adulteration of human food. Less care of preserved food and dependence upon antibiotic treatment is likely to develop. Medical authorities have reported marked increase in percentage of population sensitivity to penicillin since its wide use in the treatment of mastitis in dairy cows, and for many diseases for which it has been employed. The same situation could conceivably develop following use of several other antibiotics for food preservation. The end result is to lose the value of highly efficacious agents.

▼ ▼ ▼

A Big E for Hens

The hen is a more efficient egg producer than 25 years ago. According to the U.S. Department of Agriculture, the rate of lay per hen during 1954 was 184 eggs per layer. During 1930 the average was only 121 eggs. Last year 100 hens produced as many eggs as 152 hens produced in 1930. The U.S. laying flock averaged 354,765,000 hens in 1954, only 10% larger than 25 years ago, but total egg production jumped 67%. In other words, 85% of the increase in production resulted from a higher rate of lay and only 15% from the increase in number of layers—*Feedstuffs*, Dec. 17, 1955.

more and more veterinarians find that the

soothing, protecting healing influence *of*

DESITIN® ointment

Jars of 1 lb.
Tubes of 1 oz., 2 oz., 4 oz.

is **persistent** *in*

wounds (especially slow healing)
burns • ulcers (external)
postpartum perineal tears
sore, cracked teats • otitis externa

... because DESITIN OINTMENT adheres longer to the skin areas being treated ... does not liquefy or crumble at body temperature, nor is it decomposed by secretions, exudate, perspiration, urine or excrement.

DESITIN OINTMENT, rich in cod liver oil, eases pain, itch and irritation, eliminates necrotic debris, accelerates smooth tissue repair in many kinds of tissue injuries ... without sensitization or irritation.

for professional **samples** *and literature, write* ... Veterinary Department

DESITIN CHEMICAL COMPANY
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- **Amino Acids**
- **Minerals and Vitamins**

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Write for an illustrated folder today or ask your distributor.

NUTRITIONAL MINERALS

Box 505, 404 E. 12th St.

Sioux Falls, S. Dak.

Doctor E. F. Sanders Joins Pitman-Moore Company

Pitman-Moore Company, Division of Allied Laboratories, has announced the addition of Dr. E. F. Sanders, KSC '27, to the scientific

Dr. E. F. Sanders

staff of its biological laboratories at Zionsville, Indiana.

Following graduation, Doctor Sanders served on the technical staff of the Department of Veterinary Science, Massachusetts Agricultural College, at Amherst, conducting the State Pullorum Disease Eradication Program. Later, he joined the Veterinary Department at the University of Missouri as assistant professor.

Since 1931, he has been affiliated with the Jensen-Salsbery Laboratories in Kansas City, Missouri.

▾ ▾ ▾

Of the nation's 17,000,000 dog-owning families, 20% now have two or more dogs according to release prepared by Gaines Division, General Foods Corporation, Kankakee, Illinois.

"Protective Milk"

"Protective Milk" is the name applied to milk carrying antibody titers against diseases or sensitizing agents that confer passive immunity to consumers.

Two well-known Minnesota University scientists, Dr. William E. Peterson, Dairy Husbandry Department and Dr. Berry Campbell of the University's medical school anatomy department, have developed the new principle of protective substances in milk, according to feature report in *Hoard's Dairyman*, November 25, 1955.

Research completed thus far indicates that man may develop immunity of significant degree to diseases caused by virus, bacteria, certain molds and fungi, pollen, and dust by consuming the recommended amount of protective milk daily. Protection would remain effective only with continuous consumption of milk from the animal or animals treated to produce specific antibodies desired. In their experimental work, Doctors Petersen and Campbell have injected antigens of various kinds into the udders of cows and determined that large quantities of antibodies, stimulated by the injected material, return in the milk. These antigens included virus and bacterial vaccines (killed), fungi, and agents commonly associated with producing hay fever.

It has been established that various species of animals pass on, from mother to young, antibodies which are available immediately via the colostrum. It has been the general belief that it is impossible for animals or human beings to acquire this immunity through the digestive system beyond the first 72 hours after birth. The Minnesota research points out that man and animals, as adults, can make use of protective, passive immunity by absorption through the digestive system.

The researchers report that the range of bacterial species to which the cow's udder will react is wide. Combinations of antigens can be injected into the udder and each variety, as antibodies, will be returned in the milk. Furthermore, they have demonstrated that processing technics do not destroy immunity factors.

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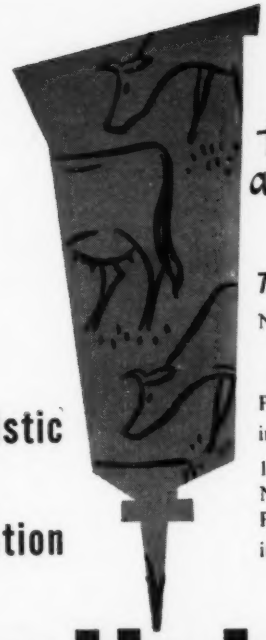
A state voluntary animal health reporting program has been established in Arkansas, sponsored by the Arkansas State Board of Health and the U.S. Public Health Service with the cooperation of the Arkansas Veterinary Medical Association.



for mastitis and topical application

A synergistic antibiotic combination

7.5 cc. tube contains:

Neomycin sulfate . . . . . 100 mg.
(equivalent to 60 mg. standard neomycin base)

Polymyxin B sulfate . . . 100,000 Units

in a free-flowing milk miscible base.

100 cc. multi-dose vials, each 10 cc. contains:
Neomycin sulfate . . . . . 100 mg.
Polymyxin B sulfate . . . 100,000 Units
in a free-flowing milk miscible base

Daribiotic*

Neomycin—Polymyxin B, Massengill

for intestinal and uterine infections

Each green oblong tablet contains:

Neomycin sulfate. . . . . 25 mg.
(equivalent to 15 mg. standard neomycin base)

Polymyxin B sulfate . . . . . 25,000 Units

conveniently packaged for dispensing in pliofilm strips.

Twenty-four individually sealed tablets per carton.

THE S. E. MASSENGILL COMPANY

VETERINARY DIVISION

Bristol, Tennessee

Kansas City • San Francisco • New York

*U.S. Pat. 2,565,057

the positive answer to your disposal problems . . .

WITHOUT SMOKE, ODOR OR FLY-ASH

SILENT GLOW
"POSITIVE PRESSURE"
MODEL 40
Crematory
DESTRUCTOR

This Crematory **DESTRUCTOR** is the *only* type that is positively fulfilling every health and sanitation requirement by completely destroying small animal and poultry carcasses, kennel waste, laboratory and hospital refuse to a white ash with "positive pressure", odorless and smokeless operation without a chimney.

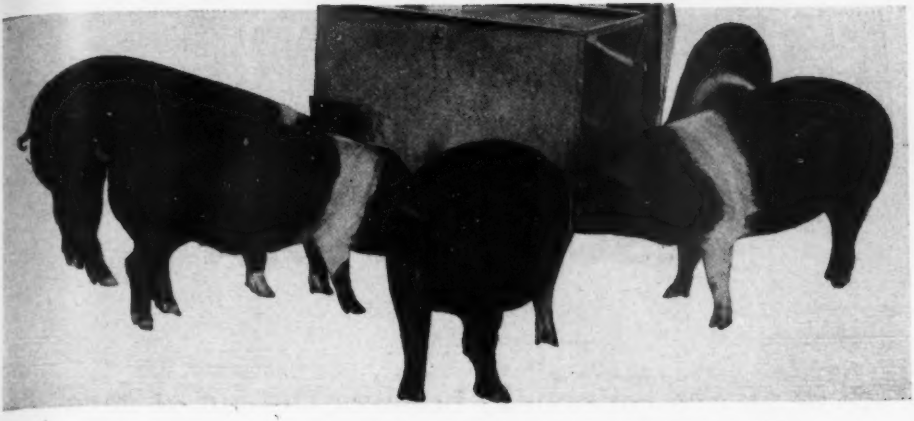
The Crematory **DESTRUCTOR** improves neighborhood relations with its smokeless, odorless, sparkless operation. Immediate disposal of carcasses and waste material eliminates the need for refrigerated storage equipment, unsanitary refuse cans and scavenger truck pick-up service . . . permitting "hospital clean" maintenance of premises.

The compact **DESTRUCTOR** is easy-to-use, attractively designed and completely weatherproofed for installation in outdoor locations and environments.

Write today for list of distinguished **DESTRUCTOR** owners, which includes noted Veterinarians, Government Agencies, Humane Societies, Laboratories, Pet Hospitals, Kennels and Animal Farms.

THE SILENT GLOW OIL BURNER CORPORATION
869 Windsor Street • Hartford 1, Conn.

For further details mail this advertisement with your letterhead.



for dispensing and use by veterinarians only

for prevention and treatment of disease . . .

Terramix-5

5 Gm. of oxytetracycline hydrochloride (Terramycin*) activity per lb.

Terramix-10*

10 Gm. of oxytetracycline hydrochloride (Terramycin*) activity per lb.

. . . the growth-promoting, nutrition-enhancing, disease-preventing and therapeutic activity of Terramycin* in a form easy to dispense and easy to administer

these products blend readily into the livestock and poultry rations (grain, silage, or mash), and can conveniently be incorporated in premixes.

in the NEW 5-lb. re-usable dispensing canisters with removable labels

Pfizer

Department of Veterinary Medicine
PFIZER LABORATORIES, Brooklyn 6, N. Y.
Division, Chas. Pfizer & Co., Inc.

*Trademark

MILKSTONE...

RESULT OF SIN

All of us are constantly battling the sin of carelessness that results in milkstone, waterstone and contaminated milking equipment.

We sincerely believe that "one keep-clean is better than ten make-cleans," whether you're talking about eggy breakfast dishes, bucket milking machines or a 400-ft. pipeline milker.

That's why Surge Dealers and Servicemen repeatedly urge prompt rinsing and washing to avoid the sin of milkstone.

Babson Bros. Co. will be glad to supply you with a quantity of this helpful pamphlet for distribution to dairymen in your area.

Write to:

BABSON BROS. CO.

2843 W. 19th Street • Chicago, Illinois

ATLANTA • HOUSTON • KANSAS CITY • MINNEAPOLIS
SACRAMENTO • SEATTLE • SYRACUSE • TORONTO

Surge

the trend is to

VIROGEN D-H*

for immunization against canine distemper, infectious canine hepatitis, and the common secondary bacterial invaders of the distemper complex.

Virogen, the *original* combination of distemper vaccine and secondary invaders, has been

often imitated;
never duplicated . . .

In Virogen D-H, this unmatched vaccine has been augmented by the addition of a potent anti-hepatitis vaccine. For that reason, Virogen D-H is the product of choice for *complete* protection against the diseases most devastating to dogs.

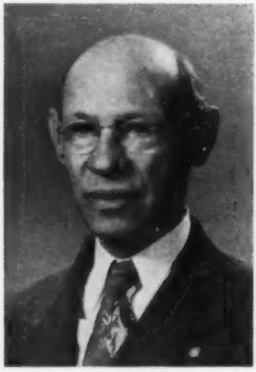
*Trade Name for Canine Distemper Vaccine and Infectious Canine Hepatitis Vaccine in Bronchisepticus-Streptococcus-Typhimurium Bacterin. (P.-M. Co., Bio. 667)

PITMAN-MOORE COMPANY
Division of ALLIED LABORATORIES, INC., *Indianapolis*

Ernest Cohn

1884-1955

Ernest Cohn, Pitman-Moore Company advertising manager, died November 29, 1955, in Robert Long Hospital in Indianapolis, Indiana. He was 71 years of age.



Ernest Cohn

Mr. Cohn was to have retired December 1 after 38 years with Pitman-Moore and more than a half century in the advertising field.

A native of Indianapolis, Mr. Cohn played an important role in the early days of advertising. He was president of the Indianapolis Advertising Club in 1916-1917. He helped found and was the first president of the Indianapolis Better Business Bureau having served as a member of the Indianapolis Vigilance Committee, forerunner of the present day Better Business Bureaus.

Mr. Cohn was a recognized authority on medical superstitions. Part of his collection of material on the subject is on exhibit in the Smithsonian Institute in Washington, D.C., and the Museum of Man in San Diego, California.

In addition to his advertising activities, he edited several of the firm's publications, including *The Allied Veterinarian*, and was prominent in civic and community affairs.

▼ ▼ ▼

Antibiotic Exports

Of the 323,030,000,000,000 units of penicillin sold last year, 123,890,000,000,000 were exported—an increase of 20% over the number of units exported during the previous 12 months.

In the long fight against mastitis, a long step forward . . .

MASTRICOMB
Trademark
with papain

25 Gm. disposable plastic syringe

papain *to pave the way*
mastricomb *to do the job*

procaine penicillin G	1 million units
dihydrostreptomycin	500 mg.
sulfamerazine	750 mg.
sulfathiazole	750 mg.
papain	50 mg.
cobalt sulfate	5 mg.

in a base which has been especially formulated for long-lasting effect through slow release of the active ingredients.

Also available: MASTRICOMB (without papain) and MASTRICOMB-750 (containing 750,000 units of penicillin, 200 mg. of dihydrostreptomycin, 750 mg. each of sulfamerazine and sulfathiazole, and 5 mg. of cobalt sulfate.)

DVM

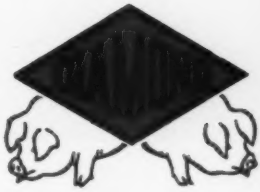
DRUGS FOR VETERINARY MEDICINE, INC. P. O. Box 6676, Denver 16, Colorado

D·L·V*

Hog Cholera Vaccine

- Confers Solid Long Lasting Immunity.
- Standard Dosage (2cc. of D L V - 10cc. Serum).
- Used with Maximum Results on Millions of Swine.
- Now available in 2, 5, 10, 20 and 50 dose packages.

*Diamond Laboratories Vaccine



Diamond Laboratories is exclusively owned and operated by Practicing Veterinarians.

Whether it's D·L·V, or one of the many other Diamond Products, you can be assured of quality products of the highest standard.

Quality Products of Dependability

SERVING THE GRADUATE VETERINARIAN EXCLUSIVELY

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ur clients will like the easy-to-administer
ture of this ideal dispensing item. You will like
consistent results obtained from the
tine use of this newest of the broad-
ectrum antibiotics, first introduced to the
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ilable in: 1/4-lb.; 1/2-lb.; 1 lb. and 5 lb. jars.

LYOTIC INTRAMUSCULAR:
00 mg.-500 mg.-1.0 Gm.-5.0 Gm.
LYOTIC INTRAVENOUS: 100 mg.-2.5 Gm.
LYOTIC OBLETS®: 4's-6 x 4's
LYOTIC CAPSULES: 50 mg., 25's-100's;
00 mg., 100's; 250 mg., 16's-100's
LYOTIC TABLETS: 50 mg., 25's-100's;
00 mg., 25's-100's; 250 mg., 16's-100's
LYOTIC MASTITIS OINTMENTS ¼ oz.
LYOTIC COMPOUND MASTITIS OINTMENT: ¼ oz.
LYOTIC OPHTHALMIC OINTMENT 1%: 6 x ⅛ oz.
LYOTIC TOPICAL OINTMENT 3%: 1 oz.
LYOTIC SOLUBLE (Tinted) POWDER:
4 lb.-¼ lb.-1 lb.-5 lb.
TANIZED® RABIES VACCINE: (Canine):
e-5 x 1 dose-10 doses

AVIANIZED CANINE DISTEMPER VACCINE:
1 dose-10 x 1 dose
ANTI-CANINE DISTEMPER SERUM AND ANTI-INFECTIOUS CANINE HEPATITIS SERUM: 20 cc., 100 cc.
INFECTIOUS CANINE HEPATITIS VACCINE: 2 cc.-10 cc.
BRUCELLA ABORTUS VACCINE: 1 dose-5 x 1 dose-5 doses (25 cc.)
FELINE DISTEMPER VACCINE: 1 immunization (2 vials Vaccine, 2 vials Sterile Diluent, 2 cc.)
ANTI-FELINE DISTEMPER SERUM: 50 cc.
CARICIDE® Diethylcarbamazine TABLETS: 400 mg., 25's
DIETHYLSTILBESTROL SOLUTION: 10 cc.-50 cc.
LEPTOSPIRA CANICOLA-ICTEROHEMORRHAGIAE BACTERIN
Whole Culture Inactivated Vacuum-Dried

IN MILK FEVER

excels even in herds with histories of relapses

NORCALCIPHOS

calcium, magnesium dextrose, phosphorus

Norden calcium solutions are non-precipitating even after freezing.

LONGER, MORE EFFECTIVE THERAPEUTIC ACTION Norcalciphos provides calcium, phosphorus and magnesium in metal-organic form for **decreased ionization rate and longer therapeutic action.** In contrast to rapidly eliminated and more irritating inorganic compounds.

EXCELS IN COMPLICATED CASES: Balanced formula, prepared by exclusive Norden process, is especially valuable in complicated cases and in helping to prevent relapses.

LESS IRRITATION: Magnesium is available as magnesium gluconate instead of magnesium chloride—non-irritating and greater therapeutic effectiveness.

2-1 CALCIUM-PHOSPHORUS RATIO especially valuable in complicated cases or in extreme imbalance of calcium-phosphorus blood levels.

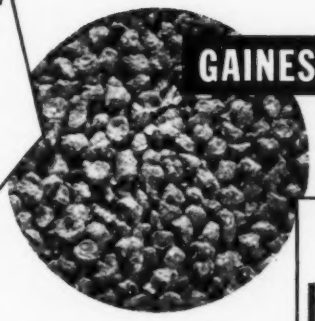
Doz. 500 cc $9.50; 3 Doz. @ $9.22; 6 Doz. @ $9.03; 12 Doz. @ $8.55

Norden®

NORDEN LABORATORIES
Lincoln, Nebraska

Patent Pending

the big difference here...



makes a big difference here...

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because the special Gaines homogenizing process combines ingredients of the Gaines formula into appetizing granules—each granule containing uniform amounts of every food element dogs are known to need.

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Announcement of Regular Corps Examination for Veterinary Officers United States Public Health Service

A competitive examination for appointment of Veterinary Officers to the Regular Corps of the United States Public Health Service will be held in various places throughout the country on February 28, 29, and March 1, 1956.

Appointments provide opportunities for career service in the field of veterinary medicine, research, and public health. Appointments will be made in the ranks of Assistant and Senior Assistant, equivalent to Navy ranks of Lieutenant (j.g.) and Lieutenant.

Entrance pay for an Assistant Veterinarian with dependents is $6,017 per year; for Senior Assistant Veterinarian with dependents, $6,918. Qualified officers are promoted at regular intervals.

Benefits other than promotions include periodic pay increases, 30 days annual leave, sick leave, medical care, disability retirement pay, regular retirement pay (based on three-fourths of annual basic pay at time of retirement), and other privileges.

Active duty as a Public Health Service officer fulfills the obligations of Selective Service.

Requirements for both ranks are U. S. citizenship, age of at least 21 years, and graduation from a recognized school of veterinary medicine. For the rank of Assistant Veterinarian, at least 7 years of collegiate and professional training and appropriate experience are needed. For Senior Assistant Veterinarian, an additional three years, for a total of at least 10 years of collegiate and professional training and appropriate experience, are required.

Entrance examinations will include an oral interview, physical examination, and comprehensive objective examinations in the professional field.

Application forms may be obtained from the Chief, Division of Personnel, Public Health Service, Department of Health, Education, and Welfare, Washington 25, D. C. Completed application forms must be received in the Division of Personnel no later than February 3, 1956.

▼ ▼ ▼

Approximately 800,000 separate species of insects have been discovered and named by entomologists.

Correction of an Historical Point

In the article entitled Our Professional Heritage by Dr. A. H. Quin, it is stated, "The Royal College of Veterinary Surgeons was opened at London in 1803".

In a letter to the editor, Registrar W. G. R. Oates advises that, "The correct date is 1844. When the graduates of the two veterinary colleges then existing in the United Kingdom, The Royal Veterinary College, established in 1791, and the Royal (Dick) Veterinary College, Edinburgh, established in 1823, joined hands to obtain a Royal Charter for the establishment of an overall superintending body whose motto *"Vis Unita Fortior"* explains the reason for this action".

The Royal College of Veterinary Surgeons (R.C.V.S.) is not a teaching body but rather what would amount to the Federal Registration and Licensing Board in this country. The R.C.V.S. has statutory powers of accrediting veterinary schools, registering and disciplining veterinarians, examining for licensing and postgraduate examinations, and for generally acting as the controlling body of the veterinary profession in Great Britain.

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MEETING CALENDAR

Iowa Veterinary Medical Association. Annual meeting. Hotel Ft. Des Moines, Des Moines, Ia., January 17-19, 1956. F. B. Young, Waukee, secretary.

Michigan State University Postgraduate Conference for Veterinarians. Michigan State University College of Veterinary Medicine, January 18-19, 1956. C. F. Clark, East Lansing, dean.

Virginia Veterinary Medical Association. Annual meeting. Hotel John Marshall, Richmond, Va., January 22-24, 1956. Wilson B. Bell, 210 Clay St., Blacksburg, secretary.

California State Veterinary Medical Association. Mid-winter conference. School of Veterinary Medicine, University of California, Davis, January 23-25, 1956. Charles S. Travers, 3004 16th St., San Francisco, executive secretary.

Minnesota Veterinary Medical Association. Annual meeting. St. Paul, Minn., Jan. 23-25, 1956. B. S. Pomeroy, School of Veterinary Medicine, University of Minnesota, St. Paul, secretary.

North Carolina State College Annual Conference for Veterinarians. North Carolina State College, Raleigh, N. C., January 24-27, 1956. C. D. Grinnells, State College Station, Raleigh, chairman.

Maryland State Veterinary Medical Association. Winter meeting. Lord Baltimore Hotel, Baltimore, Md., January 26-27, 1956. John D. Gadd, Cockeysville, secretary.

Oregon State Veterinary Medical Association. Winter meeting. Multnomah Hotel, Portland, Ore., Jan. 27-28, 1956. E. L. Holden, Oswego, secretary.

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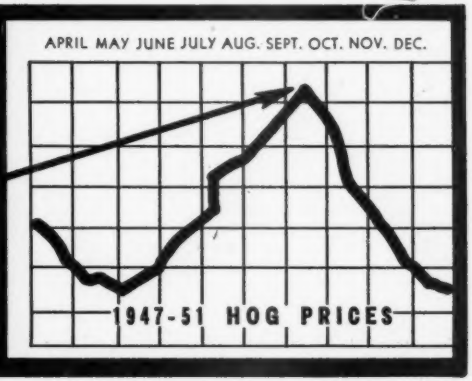

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Ontario Veterinary Medical Association. Annual meeting. Royal York Hotel, Toronto, Ont., Jan. 27-28, 1956. G. A. Edge, Box 37, Postal Station "F", Toronto 5, secretary.

Louisiana State University Annual Conference for Veterinarians. Louisiana State University, Baton Rouge, La., January 31-February 1, 1956. W. T. Oglesby, Department of Veterinary Science, Louisiana State University.

Connecticut Veterinary Medical Association. Annual meeting. Hotel Bond, Hartford, Conn., February 1, 1956. E. H. Patchen, 289 New Haven Ave., Milford, secretary.

Kansas Veterinary Medical Association. Annual meeting. Baker Hotel, Hutchinson, Kan., February 5-7, 1956. K. Maynard Curts, 70 Central Ave., Kansas City, Kan., secretary.

Texas Veterinary Medical Association. Annual meeting. Mineral Wells, Tex., February 5-7, 1956. Paul B. Blunt, 710 Maverick Bldg., San Antonio, secretary.

Nevada State Veterinary Association. Annual meeting. Reno, Nev., February 10-11, 1956. Edward Records, Box 9175, University Station, Reno, secretary.

West Virginia Veterinary Medical Association. Winter meeting. Greenbrier Hotel, White Sulphur Springs, W. Va., February 19-20, 1956. D. A. Munro, West Virginia University, Morgantown, secretary.

Missouri Veterinary Medical Association. Annual meeting. Hotel Continental, Kansas City, Mo., February 20-21, 1956. Paul L. Spencer, P. O. Box 283, Jefferson City, secretary.

Illinois State Veterinary Medical Association. Annual meeting. Hotel LaSalle, Chicago, Ill., February 20-22, 1956. C. B. Hostetler, 1385 Whitcomb Ave., Des Plaines, secretary.

Colorado A. & M. Annual Conference for Veterinarians. Glover Veterinary Hospital, School of Veterinary Medicine, Colorado A. & M. College, Ft. Collins, Feb. 20-26, 1956. O. R. Adams, head Veterinary Clinics and Surgery, chairman.

Alabama Veterinary Medical Association. Annual meeting. Whitley Hotel, Montgomery, Ala., Mar. 18-20, 1956. M. K. Heath, School of Veterinary Medicine, Alabama Polytechnic Institute, Auburn, secretary.

Washington State College Annual Conference for Veterinarians. College of Veterinary Medicine, State College of Washington, Pullman, Wash., Apr. 2-4, 1956. John R. Gorman, chairman.

American Animal Hospital Association. Annual meeting. Hotel Fontainebleu, Miami Beach, Fla., May 23-26, 1956. W. H. Riser, 5335 Touhy Ave., Skokie, Ill., executive secretary.

Maryland State Veterinary Medical Association. Annual summer meeting. George Washington Hotel, Ocean City, Md., June 28-29, 1956. John D. Gadd, Cockeysville, secretary.

American Veterinary Medical Association. Annual meeting. Municipal Audtiorium, San Antonio, Tex., October 15-18, 1956. J. G. Hardenbergh, 600 S. Michigan Ave., Chicago, Ill., executive secretary.

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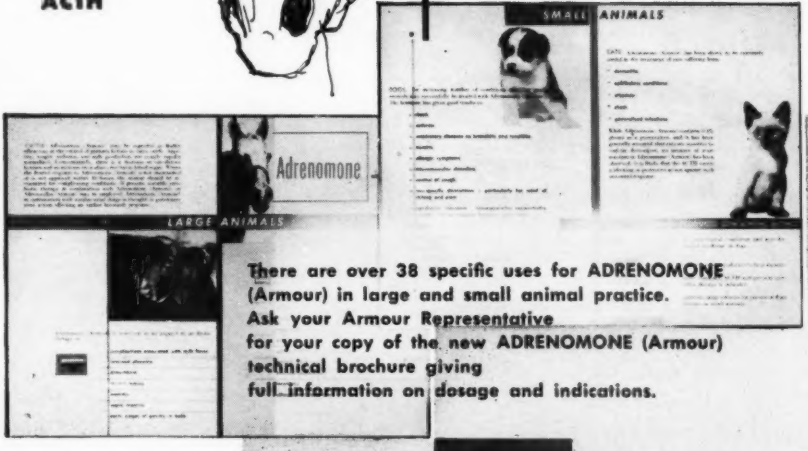

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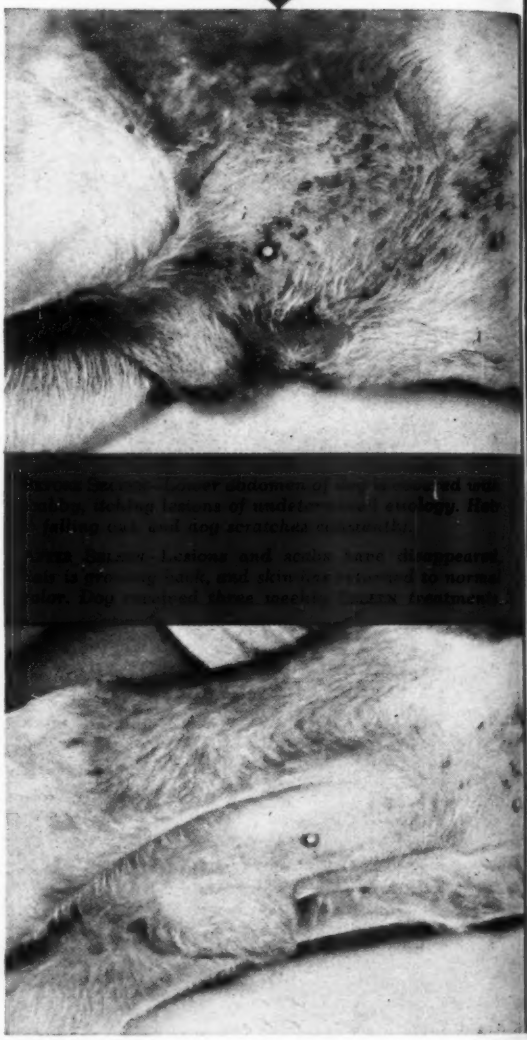

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A report appears in the Los Angeles County Livestock Annual Report to the effect that a serious outbreak of mastitis in a 115-cow milking herd (35% of animals affected) was brought to a satisfactory conclusion abruptly by replacing a faulty vacuum gauge on the milking machine.

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DEATHS OF VETERINARIANS

Leon E. Ault, Esbon, Kan., KCV '16, Sept. 22, 1955.

Samuel H. Bauman, Birmingham, Ia., CVC '92, Oct. 6, 1955.

Tracy J. Coulter, Cambridge Springs, Pa., OVC '21, July 6, 1955.

Otis Harbour, DeKalb, Miss., KCV '17, Sept. 26, 1955.

John L. Hoylman, Holdrege, Neb., CVC '03, Sept. 28, 1955.

John C. Hunt, Klamath Falls, Ore., OVC '08, Oct. 12, 1955.

Albert R. Koen, Los Angeles, Calif., KCV '06, Apr. 24, 1955.

Cal F. Lipp, Brooklyn, N. Y., KCV '13, Oct. 1, 1955.

John E. Macho, Hamilton, Mont., WASH '44, Sept. 23, 1955.

William O. Nelson, Baldwyn, Miss., KCV '16, died recently.

Carl A. Schulz, Independence, Mo., ST JOS '09, Nov. 25, 1955.

R. L. South, Henderson, Ia., KCV '14, Dec. 12, 1955.

Ashe Lockhart, Kansas City, Mo., KCV '15, Jan. 11, 1955.

Charles D. Stafford, Novato, Calif., KSC '35, Oct. 18, 1955.

Fred H. Steele, Huntsville, Ala., API '15, Sept. 27, 1955.

William E. Stimson, Bantam, Conn., UP '55, Sept. 24, 1955.

David F. Stouffer, Bellvue, Neb., KCV '06, Oct. 3, 1955.

C. Edward Taylor, San Francisco, Calif., WSC '34, Nov. 28, 1955.

E. F. Westerheide, Minster, Ohio, GR RAP '10, Oct. 1, 1955.

George H. Woolfolk, Brandenburg, Ky., KCV '06, died recently.

Thomas C. Young, Sudbury, Ont., OVC '92, Oct. 15, 1955.

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Correction

Friends and acquaintances of Dr. Emmett J. Packer will be pleased to learn that the report of his death is in error. He has advised that he is in excellent health and enjoying work in the Pacific Northwest.

Doctor Packer, KCV '18, formerly Deputy State Veterinarian for Missouri stationed at the Kansas City Stockyards, is now associated with the Poultry Inspection Service, USDA, assigned to duty at Salem, Oregon.

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PHENOLIZED RABIES VACCINE CONTROLS OUTBREAK

According to Frederickson *et al.*,[1] the 1950 to 1951 rabies epizootic in St. Louis was controlled quickly, by mass vaccination of the dog population, after quarantine measures alone had failed. Neighboring communities continued to have a high incidence of rabies. Although only about 0.5 percent of the 38,006 dogs vaccinated in the clinics received modified live virus vaccine, and the overwhelming majority received the usual 20 percent phenolized vaccine of caprine and ovine origin, not a single case of postvaccinal paralysis was reported to the Health Division. These figures would indicate that the danger of postvaccinal paralysis in dogs, following administration of phenolized rabies vaccine, may have been greatly exaggerated recently.

1. Frederickson, L. E.; Willett, J. C.; Smith, J. E., and Price, E. R.: Metropolitan rabies epizootic controlled by vaccination. Vet. Med. **48** (1953) 276-279. 288.

(*from The North American Veterinarian, Nov. 1953*)

Experience —

The article at left as news is not new. It is timely only because it is human nature to seek the sensational, and overlook tried and time-proven methods. Phenolized rabies vaccine has been used as an efficient control measure for many years.

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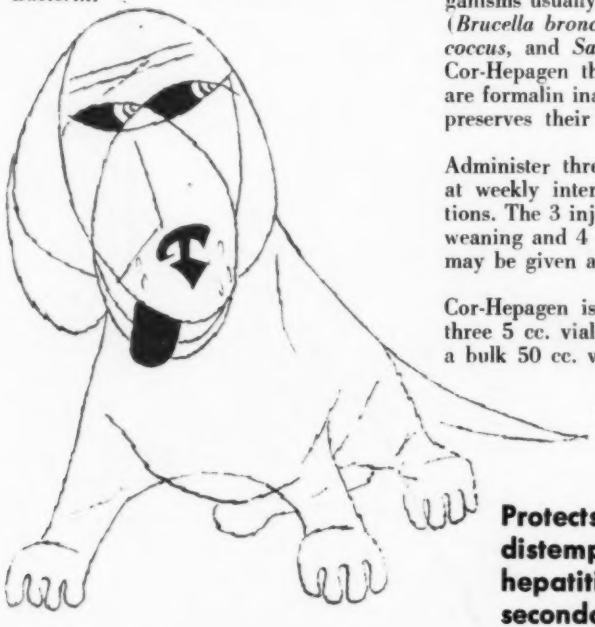

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